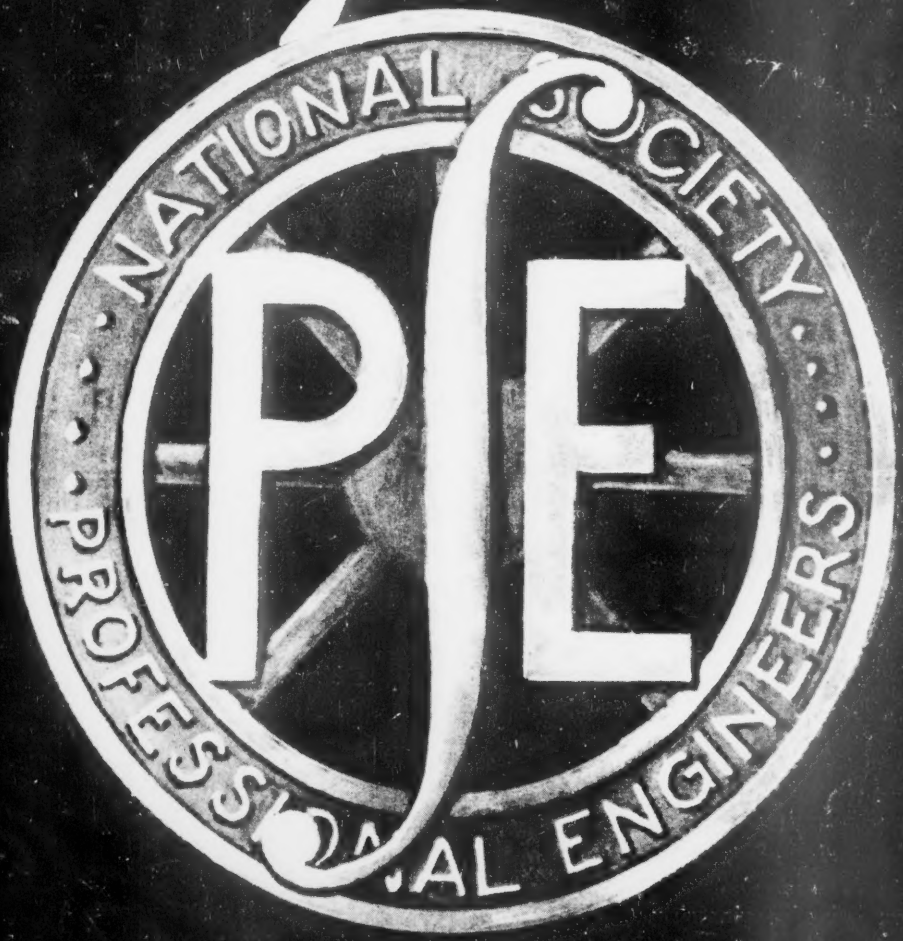
The American Engineer



JANUARY 1948

VOLUME 18 NUMBER 1

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

NEW NSPE EMBLEM

On the cover of this issue of the AMERICAN ENGINEER *appears a new NSPE emblem which has been approved by the Board of Directors for use in public relations and for other purposes.*

IN NO SENSE DOES THIS EMBLEM REPLACE THE SHIELD WHICH IS THE BADGE OF THE PROFESSIONAL ENGINEER. THE SHIELD WILL CONTINUE TO BE THE OFFICIAL NSPE INSIGNA.

The new emblem, however, may be used in a number of instances where the official shield could not be appropriately displayed. For example, it may be made up into a metal shield which can be displayed by the Professional Engineer on his automobile. It can be used on stationary, where the official seal may no longer be used.

The new emblem was conceived by Dr. D. B. Steinman and was worked out by several members of the NYSSPE and the NJSPE working jointly. Prior to the Board of Directors action in Buffalo, the seal had been adopted for public relations use by the New York and New Jersey Societies. Its significance is explained in the following paragraphs.

By Dr. D. B. Steinman

A satisfactory emblem design must be simple, symbolic, and distinctive. The symbolism must be appropriate to the entire engineering profession and not merely to any particular divison of the profession.

The design here presented consists of a circle (representing a wheel) framing an integral sign and the letters P and E. It is simple; it is symbolic, it is distinctive.

The most significant element of the deisgn is the *integral sign.* It symbolizes mathematics—the working tool of the engineer and the foundation of the engineering method—typifying careful analysis, sound reasoning, scientific rigor, accuracy, and precision. It also symbolizes integration—the dominant characteristic of the work of the engineer. The engineer takes the elements of nature, the component materials and forces of nature, and integrates them, combining them to new and useful functions. The primary function of the engineer is not to break down or destroy, but to build, to construct, to unite, to integrate.

Moreover the integral sign denotes the integration of the profession, the uniting of all the divisions, branches and specialties into a single integrated profession. Integral means whole. The integral is the emblem for the whole profession, the symbol of solidarity and of strength.

The characteristic of being integral is integrity. Integrity is the essential characteristic of the engineer, and integrity is the essential characteristic of the works he builds.

Flanking the integral sign and united by it are the letters P and E, standing for the Professional Engineer. P stands for concentrated force, for potential and power; E stands for elasticity, electromotive force, energy. These are familiar symbols to the engineer, representing the forces and elements with which he works. P also stands for the Profession, and the potential power of the Profession; while E stands for the Engineer, and the effort, earnest endeavor, and energy of the Engineer. E has also come into accepted use as the symbol and reward for excellence; likewise it stands for economy and efficiency. Efficiency, economy, and excellence are the dominant guiding objects in the work of the Engineer.

The integral sign framed between the letters P and E suggests a mathematical relationship. It can be read as "P is the integral of E," to remind us that the Profession is the integration of all Engineers and of their united effort. It can also be read as "P times the integral of E," to remind us that the sum of the individual contributtions of Engineers is multiplied by the power of the Profession united in concerted effort.

For those who may wish to use the design as an organization emblem, it may be pointed out that the integral sign is, by origin, a long S, denoting summation. The combination of the integral sign with the letters P and E may therefore be read as a monogram representing the Society of Professional Engineers." The S also signifies strength, soundness, safety, the scientific methods, and service to society.

The design is framed in a circle, the perfect curve. The *circle* has no beginning and no end, and is alike in all its parts. It is the symbol of strength, of unity, of equality, of the things that endure.

The circle in this case also represents the *wheel.* The wheel was the first great mechanical invention, and is therefore a fitting symbol of engineering discovery and progress. The wheels of industry and the power that drives them are the works of the engineer. The wheel is likewise the symbol of transportation, and this too is created and powered by the engineer. And it is the engineer who plans and builds the structure that houses the wheels of industry, and the roads and structures that carry the wheels of transportation.

Furthermore, the wheel is the symbol of the dynamic, as distinguished from the static. It is the symbol of power, of useful effort, of labor-saving, and of progress.

The design also indicates the spokes of the wheel. The spokes join the segments of the circle to a common center, representing unity. All branches and activities of the profession are united to a single central core. The circle is a symbol of universality, of the universe conquered and of the world united; and the radiating spokes symbolize the manifold functions of the engineer radiating in all directions to serve the whole world and to benefit all mankind.

There is the emblem: An integration of all Engineers—the Profession founded on mathematical science—the Profession that integrates, that builds, that creates the wheels of progress, serving and benefiting all mankind.

Engin. Lib.

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Editorial

The Report of the N. S. P. E. Military Affair Committee (See Page 16) at the recent Buffalo annual meeting bids fair to become an important document in bringing about a realignment of military attitude toward professional engineers.

While official cognizance of the document has not as yet been taken, the December 27 issue of Armed Force, the semi-official military services publication, carries a detailed news story concerning it together with pertinent editorial comment.

John A. Killick, managing editor of the publication, in his editorial entitled "Teamwork Needed," writes:

"Blunt criticism of the Army and Air Force by a reputable engineering society for failure to utilize effectively, either in war or in peace, the engineering resources and personnel of the nation cannot be lightly dismissed. The formal charges of the National Society of Professional Engineers are related in a news story elsewhere in this issue. They merit investigation by the Departments of the Army and the Air Force, and rectification if they are proved correct.

"It was relatively easy in wartime for apologists to shrug off criticism by citing the demonstrable impossibility of placing each man in the exact job where his talents could be best adapted and most effectively used. This excuse loses validity in peacetime.

"Despite the beneficial impact of millions of citizen soldiers on the military and naval establishments during the war, there still remains a diehard core of regulars who refuse to believe that anything good can originate or exist anywhere except in the regular services. Until this deadwood fringe is cleaned out, there constantly will be obstacles placed in the path of soliciting, obtaining and using competent outside professional and technical aid.

"Happily, there is evidence that in certain quarters some progressive professional soldiers are going out of their way to utilize civilian talents for the benefit of the regular establishments. Witness the Chemical Corps. Ludlow King, president of the Chemical Corps Association, recently reported to members of his group that:

" 'The Chemical Corps Association is currently executing missions for the Department of the Army in connection with Industrial Mobilization in the Chemical Industry, and it is expected that these missions will be broadened in number and importance.'

"We can only echo his hope, expressed in the same report, that: 'the Department of the Army will make a thorough study of all military associations in order to evaluate their capabilities, and to assign responsibilities in connection with developing a sound industrial mobilization plan.'

"We'd go further. Let that study extend beyond military associations, and make it broader even than industrial mobilization. We've already learned that modern war means total mobilization. Total mobilization, in turn, encompasses the complete use of every resource, talent, brain and muscle in the nation—and the best of each. The nation has proved on several occasions that its people are anxious to contribute to its defense. It would be reprehensible if the regular establishments were to allow the blindness of an unregenerate minority to deprive them of a vast reservoir of civilian talents."

While Armed Force is not an official military publication, it is highly regarded by top service personnel. The news story and the above editorial will serve to call attention to the N.S.P.E. report and will cause the military and naval officers concerned with the problem of utilizing engineers to stop and think.

While the views expressed in Armed Force are no guarantee that favorable action will be taken on the N.S.F.E. recommendations, the esteem in which John Killick and his associates are held by the Army, Navy, and Air Forces is sufficient to assure their serious consideration.

Let us hope that the excellent Military Affairs Committee Report and the Armed Force coverage of it will be sufficient to bring about a different and healthy attitude on the part of the military services toward professional engineers.

The traditional relationship between engineers and the military services makes the armed forces a natural group for concentrated efforts on behalf of engineers. It is certain that NSPE's Military Affairs Committee will strive vigorously for improved conditions in the military.

If the armed services will recognize the true value of professionalism among engineers, it is possible—even highly probable—that other government agencies will follow suit.

While the current government policy may not be to require that its engineers be registered, we cannot agree that government cannot compel them to maintain professional standards.

We believe that the government can require professional standards from its engineers and that, as a matter of fact, it should in the public interest. The Military Affairs Committee Report may be the wedge which will open government's door to professionalism. Such a development during the New Year would be very welcome.

Younger Engineers Problems Highlight NSPE Buffalo Meeting

Thirteenth Annual NSPE Banquet

"This is a dream come true."

With these words Dr. D. B. Steinman, first President of the National Society of Professional Engineers characterized its Thirteenth annual meeting in Buffalo, December 4, 5 and 6.

While few members have contributed so long a span of service to NSPE as Dr. Steinman, the Thirteenth annual meeting represented to all those present a high point in NSPE's history.

The Buffalo meeting was the biggest yet held, with approximately 450 members present. It was outstanding from the business standpoint, being the most important and signifiant yet held by the Society. It was an important social event.

Probably the most important single development of the three day session was in connection with the problems of younger engineers. In adopting the report of the new Committee on the Problems of Young Engineers (see page 12), the Board instructed the group to intensify its efforts to bring about improved conditions which will afford younger men of the profession an improved place in the social scheme.

Ritchie Lawrie, Jr., president of the Society said: "NSPE is about to embark on a program which will bring about proper recognition by both industry and the public of the true importance of younger men of the profession. The importance of this group to the future of the country has been overlooked for too long.

"It is high time that a concentrated effort be made not only to increase the esteem in which they are held by the public but also to increase their professional stature and consequently their value to industry and government.

"More and more the engineering profession is being called upon to accept public responsibilities. It is altogether proper that men, who are to a large degree responsible for new technical developments in such fields as atomic energy, electronics, supersonic speeds, and others, should be called upon to accept a role in controlling their use. None of these developments would have reached its present stage without the work of engineers.

However, as it becomes necessary for the profession to accept these public responsibilities, it also becomes necessary that it attract high calibre men to its ranks. Such men can be attracted only if the social prestige of the profession is increased and if professional status is recognized and assigned its true value.

"It is highly appropriate that NSPE, as the professional society for engineers, should undertake such a program. It will be carried on vigorously until this very necessary goal is achieved.

Dr. Harry Winne, vice-president of General Electric Company, speaking before the annual meeting on Saturday morning, December 6, said, that

young engineers should concern themselves chiefly with opportunities offered by industry rather than with tenure and pay. He said: "The only security a young engineer should worry about is security of opportunity." (For Dr. Winne's address see page 6).

Dr. Allen R. Cullimore, president of Newark College of engineering, in reviewing the problem, said: "Young engineers, in the main, are not sufficiently interested in management or in the operation of engineering projects at a profit. Too many believe that the farther they can keep away from politics, profit and people the higher will be their professional standing." (For Dr. Cullimore's address see page 9).

Government's Role

In speaking of professional problems, Kenneth Markwell, Assistant Commissioner of the Bureau of Reclamation, said: "We (the Bureau) desire to enhance in every way possible the prestige and value of the engineering profession. We encourage our men to become registered engineers to the greatest degree possible, although this, as a practical matter, must remain for the individual to decide. Government cannot and does not desire to attempt to compel them to become registered engineers and members of engineering societies and, of course, the cost of belonging to engineering societies must be borne by the individuals. However, a large number of our engineers, especially in the higher brackets, are so affiliated.

"We seek to advance our competent people rapidly as is consistent with their abilities and because of our expanding and far-flung programs we anticipate no lack of opportunities. Engineers necessarily hold the greater majority of the top administrative posts, as well as the top construction, design, and research posts, even though our responsibilities have been added to so greatly in the non-engineering fields. The increasing demand for projects in circumstances where economic feasibility presents serious problems, extends into fields other than pure engineering. These fields are where the business manager and economist, and the public administrator are required.

"In closing, I should like to comment on another factor affecting the engineering profession—that of compensation for the individual. If the engineering field is to continue to attract the highest calibre people as a career, and if we are to maintain and continue upward the advances that our profession has made, its compensation must be made attractive, in competition with the many other lines of activity calling for the best of our manpower these days. I think that this is an aspect of the engineering career to which we can all give some attention with profit to the nation."

The major portion of Mr. Markwell's speech was devoted to the professional engineer's role in resources development.

Other major problems considered by the Board of Directors included military affairs and engineers (see page 16), general administration of the society (see page 14), the Public Relations Committee's recommendation that a new emblem be adopted for public relations purposes (see inside front cover), and a new legislative policy (see page 13).

Major Committee reports included that of the Constitution and By-Laws group. This Committee was instructed at the Board of Directors meeting in Washington to draft a model constitution for the guidance of member state Societies. The model has been drafted and was submitted to the Buffalo meeting.

Constitution and By-Laws

The Constitution and By-Laws Committee reported: "In considering the matter of a model constitution, it must be borne in mind that modifications will need to be made in each individual state to meet its particular needs and to conform to its laws relative thereto. However, it should be a reliable guide for state societies now in process of organization, and should ultimately bring about a condition of uniformity so much needed for the effective functioning of our Society as a whole. Undoubtedly, too, many States that are now dissatisfied with their present Consitution and By-Laws will welcome the help of a model document in making revisions for the future." (Copies of the new model constitution are available upon request.)

The Employment Practices Committee reported on its joint activities with the Engineers Joint Council in issuing three publications: (1) the Survey of Employer Practices Regarding Engineering Graduates, (2) the Manual on Collective Bargaining for Professional Engineers, Part I, and (3) The Engineering Profession in Transition.

The Committee also reported on the success of the profession in having the National Labor Relations Act amended and advised the Board that it will continue to maintain a vigilant attitude with respect to the administration of the new law in order to prevent any executive action which might tend to circumvent the intent of Congress with respect to professional engineers.

The Extension Committee reported on the situations prevailing in a number of States, but the most concrete evidence of the work of this group is found in the fact that a new member State Society was admitted to the National Organization by the Board. The new group is in South Carolina and was represented at the meeting by Mr. Roy Allen Stripp of Greenville, South Carolina.

As is required by the National Constitution, the results of the annual election of NSPE officers was announced at the meeting. The officers for 1948 are (see page 5): President, Alex Van Praag of Illinois; Vice-Presidents, William F. Ryan of Massachusetts, Lawrence Peterson of Wisconsin, Robert Coltharp of Texas, and A. J. Shaver of Nevada; and Treasurer, Russell B. Allen of Maryland. Paul H. Robbins was reelected as executive director of the Society for the coming year.

The annual meeting also selected sites for the importnat NSPE meetings of the coming year. The 1948 annual meeting will be held in Chicago, Illinois during the first fifteen days of next December, and in accordance with instructions from the Board, at such time as not to conflict with any meetings of the founder societies which are being held at that time of year.

The March Board of Directors meeting will be held in Detroit, Michigan and the summer Board meeting will be held in the Southwest, with the exact location still to be determined.

Social Events

Climax of the social events of the meeting was the annual NSPE Banquet which was held in the main ballroom of the Statler Hotel in Buffalo. Colonel Harold Hoffman, former Governor of New Jersey was the speaker of the evening. Colonel Hoffman proved to be an entertaining as well as constructive speaker. His rapid fire delivery coupled with an entertaining humor kept the audience fascinated. Dancing followed the dinner and speeches.

Other important social events included the Board of Directors Luncheon and the Past President's Luncheon, as well as the Get-Acquainted Buffet Supper.

National Society of Professional Engineers 1948 Officers

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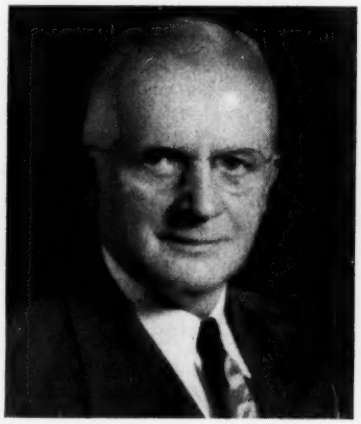

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The Engineer—

AN INDUSTRY VIEWPOINT

By Harry A. Winne
Vice-President, General Electric Co.

Our session this morning, I believe, is to be devoted to consideration of the engineer, and engineering societies, as others see them, and I have been asked to present some of indutry's views. Now I submit that the viewpoint in industry of engineers can hardly be classed as the viewpoint of others, for industry and engineering are inseparable. Engineering is the very foundation of today's industry. Without engineering we would have no industry as we know it. Even if we had it, without engineering we could not keep it functioning, and without engineering we could not use its products.

Three Viewpoints

Nevertheless, I am glad for the opportunity to express some views on the engineer, the engineering profession, and engineering societies. At this point I want to acknowledge the great assistance in the preparation of this paper which I have received from several of my associates in General Electric, particularly Messrs. P. L. Alger, M. M. Boring, T. M. Linville, and J. L. Garrison.

Perhaps it may be well to look at our profession from three standpoints: the opportunities it offers; the responsibilities it involves; and the recognition it brings. One might say that these three factors correspond, to some extent, to the ages of man. The young man should be concerned primarily with the opportunities. Too often he seems most interested in the recognition. I shall have more to say about this later. The middle-aged man, it seems to me, should be most aware of his responsibilities. The older man, in summing up his life's work, has more occasion to think in terms of the recognition which his profession has brought him.

I should like to avoid classifying my approach to the subject in any one of these categories, and so I want to discuss all three: the engineer's opportunities, marvelous as I seem them; his heavy responsibilities, which follow because of his opportunities; and lastly the recognition that will come to him only if he fully meets the responsibilities which devolve upon him because of his opportunities, and because he is, or wants to be, a professional man. And it may be profitable to consider these same matters not only in their relationship to each of us as individuals, but in their relation to our society, the National Society of Professional Engineers. In our present time and place, it is understatement to add that our profession offers an adequate measure of all three.

Atomic Era

As to our opportunities in the technical field, these are commensurate with the ever growing importance of technology in our civilization. We may like to think that we are in the beginning of the "Atomic Era," with all that those magic and mystic words portend. In truth we are, though no one can say what of good or evil atomic energy may bring us. But one certainly and definitely can say that if it is to bring any good to humanity, as I firmly believe it will, the development of atomic energy must have the expenditure of untold effort on the part of the scientist and the engineer, and of industry in general.

But even if we leave atomic energy entirely out of our canvas depicting the future, we still see tremendous expanses of virgin or only partly plowed fields, awaiting that cultivation which only the engineer and his cohorts can give them, to bring them into fruitful bearing. With each new year the engineer's opportunities for technological accomplishment expand, not in arithmetical, but in high geometrical ratio.

Everyday Technology

The ever-increasing importance of the engineer's material contributions to our human well-being is not, to my mind, best measured by man's ability to split the atom, to pierce the sonic barrier, to receive reflected signals from the moon, spectacular and promising for the future as these are. Rather, it is illustrated by what technology means to our everyday lives.

For example, it means vastly more light for hundreds of millions of eyes, in schools, in homes, in factories and offices, on the streets and highways. It means vastly more power to turn the wheels that carry the loads that once bent human backs and gnarled human hands. It means new and improved homes, requiring much less labor and time to build, and equipped to lighten the burdens of that most overworked of humans, the conscientious housewife and mother. It means higher productive efficiency, higher output per man-hour, more goods; and only this can bring eventually lower prices, higher real wages, and ultimately more leisure.

But this job is not done yet, by a far cry. I was reading just the other day an estimate that 30,000,000 American homes need four times as much light. And 100,000 office buildings, 200,000 factories, 258,000 schools need many times more light. And this is just one corner, and not a particularly dark corner at that, in spite of the need for more light, of the technological picture.

New Horizons

Moreover, events such as the discovery of fissionable materials; the development of gas turbines and rocket motors; and the production of new electronic tubes capable, for example, of providing 1,000-megacycle power (power at a billion cycles per second), have created new horizons in many fields that are even one step further removed from that which is already attained. The engineer's universe is indeed an expanding universe.

But not all, and perhaps not the most important, of the engineer's opportunities are technological. It is true that his advancing technical knowledge and accomplishments have solved many economic and material problems, but, too, they have created many new ones, particularly in the social area, such, for example, as so-called "technological unemployment," the temporary dislocation of workers which may follow a tremendous technical advance in a specific industry.

Social, Economic and Political Problems

The engineer's methods of thinking certainly can be applied with ad-

Dr. Winne's speech was delivered before the Thirteenth Annual Meeting of NSPE, Buffalo, N. Y., on December 6, 1947.

vantage to working out the solutions of many of our social, economic and political problems, whether or not these problems are of his making. The good engineer, in tackling a technical engineering problem, insists first on getting all the relevant facts, making all the tests, measurements, experiments and observations which will help him to arrive at a sound decision. He masters the details—I was about to say the important details, but in an engineering design there are *no un*important details—he builds up step by step, making sure of every stage as he goes along, until at last he has the completed structure. And, most important, at every point in his work he is satisfied only when his result meets the all important criterion, namely that it shall best fulfill its purpose of service to mankind. That of course is a difficult requirement to meet. It involves many factors —safety, utility, reliability, cost, appearance—but the good engineer is not satisfied until his product meets all that apply.

There is ample opportunity for the engineer to apply his kind of thought and analysis in the social and political field, on a community, state, national and international scale. The world needs it.

Solemn Responsibility

Now, because he has these broad opportunities, because he has the training and eperience which fits him to take advantage of them, to my mind there devolves upon the engineer a solemn and heavy responsibility, a responsibility to do more than fulfill the technical functions of an engineer, although of course that also is required. The times demand more of each one of us than that we be mere technicians in the narrow sense of the word. I am reminded of Sir Richard Livingstone's definition of a technician. It is "a man who understands everything about his job except its ultimate purpose and its place in the order of the universe." America cannot afford to lose its technical superiority, but neither can Americans afford to shirk their moral responsibility. The world is astonished if a bridge designed by engineers collapses, but the structure of society which the engineer, along with other men in creative roles, is consciously endeavoring to strengthen, or unconsciously helping to weaken, is by no means so certain to stand. Many of our social structures today are badly in need of the kind of thinking and planning that has produced our bridges and factories and buildings. This is a responsibility that devolves upon the engineer.

We may well ask ourselves "how well is the engineer meeting his responsibilities?" As for his technical responsibilities, I think you will agree that the answer can be only in terms of highest praise. In fact, we frequently hear the thought expressed that in this field he has done too well, so that our technological progress has outstripped our social. While I feel there is an unbalance, I like to think of it the other way around, namely that our social advancement has not been sufficiently rapid. So let us attack the problem of correcting

Dr. Harry A. Winne
General Electric Vice-President in Charge of Atomic Energy Program

the unbalance, not by retarding technological progress, but by accelerating our social progress. Let us apply to our social problems the same kind of fundamental thinking, the same singleness of purpose for which the engineer is trained. And this responsibility I fear we engineers have not met too well.

Community Activities

How many of us take an active part in the civic affairs of our communities? How many of us are willing to take the time required to serve on a jury; to serve on a school board, where both our technical and our economic training can be most useful to the public; to serve on town or city planning commissions, where certainly engineering is much needed; to work on appropriate Chamber of Commerce committees; to take part in similar state and national bodies. I think you will agree that the answer is, too few! Let us endeavor to change this answer!

Which brings me to the third standpoint from which I wish to consider our profession today, and that is recognition. Recognition is an elusive thing. Occasionally, but rarely, it comes suddenly, with the unpredictability of a lightning stroke. An amusing illustration of this was given in a story in the magazine "The New Yorker" a few months ago. The hero of the story, which some of you may remember, was the head of the physics department in a midwestern school in the early days of the war. It was a small department, with few students, and the professor was of the retiring type which cartoonists are so fond of drawing. When in faculty meeting he somewhat hesitantly presented the need for a new motor-generator for the physics lab, the School of Agriculture always needed a new milking machine, or a new tractor, or a new prize bull. The School of Agriculture was very large and enormously attended. Moreover, the head of the School was a very persuasive and domineering man. The perennially disappointed holder of the chair of physics was married to an equally inconspicuous woman. They had no children.

And so things went until in 1945 the atomic bombs brought the war to an end.

Birth of Twin Boys

The professor returned to the campus that fall to find that enrollment for his classes had jumped 300 per cent. Colleagues who had long ago ceased to nod, not so much from rudeness as professional absent-mindedness, and his own inconspicuousness, now greeted him effusively when they met. The professor was much in demand by local civic organizations to lecture on the atomic bomb, and his wife was called upon by several women's clubs to speak on the woman's eye viewpoint of the atom. And when, in faculty meeting, he spoke, he was listened to as an authority on the atomic age. Even his request for a 20 million volt synchrotron was passed without a murmur. And, just nine months to a day after Hiroshima, the professor's wife gave birth to twin boys!

I think the one thing about this story which may point a moral is that the professor was not particularly concerned about securing recognition for himself. In my experience, the man who is most anxious to obtain recognition for himself, who endeavors to pull all the strings and wires to attract favorable notice, is *not* the most likely to secure it. The man who is daily worrying about whether he is getting ahead as fast as he should, whether he has made the right impression on the boss

today, who is jealous of the man at the next desk or in the next office, is *not* the one who is going to make the speediest progress.

Today's Problems

I feel that advancement, and success, and the recognition which success brings, will come most surely to the man who devotes his energy, and his concern, and his worrying to the job he has today, not to the one he hopes to have tomorrow. When the head of an organization is scanning his people to pick a man for an important post, usually the man who stands out is the one who is doing his present job superlatively well. Of course, I do not mean that a man should not think about advancement, that he should not take steps to prepare himself for it so that he may be ready when it comes. Far from it. But his prime concern should be to do his present job well. I can point to case after case of a man spending so much time taking all kinds of courses in an endeavor to be ready for any kind of a job that might come along, that he never had ambition nor energy to do his present job well. Here, as in so many things, there is a happy medium.

I think I can sum up this whole matter of recognition by simply saying that *recognition comes through service.* Let us not be too concerned about recognition. Let us rather be concerned about giving service. If we do this, recognition will follow automatically. This is true whether we are considering an individual, an association, or an industry.

One thing that has disturbed me greatly in the past few years is some evidence that our young engineers today are too much concerned about security; too anxious to try to find out just exactly where they will be two years from now, ten years from now; too anxious to get a guarantee as to just how long they will have to remain on a specific job; too unwilling to take their chances in competition with their fellows; too anxious to determine whether they will get pay for overtime, and whether it will be at time-and-one-half or straight time. The only security a young engineer should worry about is *security of opportunity!*

Refreshing Viewpoint

In view of this feeling on my part, it is refreshing to find occasionally the point of view expressed by a young engineer taking one of our Advanced Engineering training courses. He was asked to write his comments on a paper by the late Dr. W. E. Wickenden, entitled "The Second Mile; a Re-survey."* Probably many of you are familiar with it.

"Thomas Edison," this young man writes, "once made the rather obvious remark that if he and his associates had restricted themselves to the then prevalent 48-hour week, they would never have been able to accomplish the tremendous volume of persistent investigation which characterizes their work.

"I wonder," our author asks, "what Thomas Edison would say if he could see the trend in working habits these days. Forty grudging hours a week, and look out for the five o'clock stampede! Certainly we have more things to beguile our leisure hours these days, and maybe Thomas was a little lacking in culture and would have been a bleeding bore at an intellectual kaffeeklatch; but, man, he got things done. He really made the chips fly. Is it good, or is it bad, this modern tendency toward diffuse and spacious living; and, if it is bad, whose fault is it? The unions, who invented the short week? The management, who invented the time clock? Or the New Deal philosophy that what this country needs is a good single-tine hay fork and an epidemic among the piglets?"

Tips His Hat

Then our author tips his hat to the old-timers and takes a crack at his contemporaries: "Have you noticed that it is the old-time machinist who puts the finish on a part where it doesn't show, and who seems to get satisfaction out of following his job out of the shop and beyond?

"The young punks, and I use the word advisedly, do a workmanlike job (usually) but their interest breaks abruptly when they have satisfied the minimum requirements.

"Sliding out from under, passing the buck, and intricate bobbling of the old hot potato of responsibility, is the order of the day among engineers as well as machinists. As someone has pointed out, it is no trick to get a responsible job; just stick your neck out and you can have all the responsibility you want. It is pitiful to see the good jobs go begging for someone who is willing to lug a briefcase of trouble home with him at night.

"Maybe this new leisure time is being used wisely and for more gracious living by the average man," and then, conscious of the work load we pile on them in Advanced Engineering, he adds a footnote, "(I can't remember what I did with mine, before I signed it away.) Poor Bernard Baruch almost got lynched when he said that many of our current ills would cure themselves if we would try a longer standard work week.

Edison A Tyrant

"If Mr. Edison were alive today, he would be regarded as a tyrant, and it would take two shifts of laboratory assistants, with double time on Sundays, to keep up with him. He would be an awful nuisance, always stealing inventions from people who were just on the verge of writing preliminary surveys on the broader aspects of the problem and were held up ('tied up' is the accepted term) by lack of facilities.

"Of course we have got people like Edison in the company," he continues. "They can be found at the top, and there are examples all through the various levels. But most of them are not of our generation. There are some young men who are balls of fire. They exude vitality and initiative. But what about 'finishiative'? I hope they have got it, because they will need it. That second mile takes a good second wind."

I think you will agree that this young man makes a good case for re-addressing some of the emphases of our times.

I think we are beginning to take steps to altar these emphases. Our technical educational institutions are certainly giving evidence that they recognize that the engineer has more than mere technical responsibility in our civilization; that he must be prepared to exercise his talents in social, political and economic matters; that, in most industries at least, he must be ready to work as part of a team; that human equations are often more important than mathematical ones. It may interest you to know that an important part of my company's Advanced Engineering Training Program is a course in Human Relations. If "recognition of ignorance is the first step to knowledge," I think we engineers are making some progress.

Quick, Frank Look at NSPE

Now I want to take a quick, frank look at our Society the NSPE.

Of opportunities and responsibilities we have plenty. Are we meeting them? There is a real opportunity today

(*Continued on page 17*)

* Published by Engineers' Council for Professional Development, 29 West 39th Street, New York 18, N. Y.

Responsibilities of the Engineer As Seen by an Educator

By Dr. Allan R. Cullimore

I don't know how many of you, in watching the speaker, glanced just a bit aside to see the next speaker, myself, in a state of extreme perspiration. The reason for this is quite evident. The thunder of my speech, if it had any thunder, has been stolen. (Laughter.) We are in one of these situations, where it seems to me, there is such a definite unanimity of opinion that my speech will be, I am quite sure, entirely in the nature of a repetition, perhaps, from a slightly different angle, but with the same thesis, the same philosophy, and the same general animating motive. It reminds me very much of a speaker who wrote a paper and when he delivered it before a meeting, the Chairman said, "Your paper was a very excellent and original document." The man felt quite complimented. He commented, "The only trouble with it is that the excellent part is not original and the original parts are not excellent." I think that might be applied perhaps, although I do not particularly wish to apologize for the paper, to what I have to say.

Things Taken for Granted

I think in approaching this question of responsibilities of the engineer, —particularly, the responsibilities of the young engineer—we ought to take some things for granted. I think the whole situation resolves itself simply into this: That we must recognize, we must realize that technological or technical competency is a necessary attribute of all engineers. That goes without saying, and it is assumed, I think, by every one. However, this particular technical competency is not necessarily a sufficient condition. There must be in the successful engineer—the successful Professional Engineer—something else to be added to his knowledge of technical or technological competency. I think when you say that, you are liable, perhaps, to be misunderstood, and I want that to be perfectly clear. I am not attempting to pipe down the question of academic, technical efficiency, fundamentals of theory and design, mathematics and physics, but I am going to say in this modern day this is not sufficient to make what we think of as a really broad gauge engineer. That is, we are thinking of something beyond a very highly intellectual, human calculating machine and going over into some of the broader values about which you have been listening for the past half hour.

Overlapping Fields

It has seemed for a long time to some of us that the division of engineering, perhaps, would be better considered from what we might call a functional standpoint. That is, we have had Civil, Electrical, Mechanical Engineering and yet there was nothing in there sometimes which seemed to tell what a man actually did. It seems to me that if we take a very simple case of water power development, the survey of the water shed and the computation and field work connected therewith would fundamentally fall into the field of civil engineering. The design of the dam falls within the same field, and perhaps the penstock, too. But when we get to the turbine, we are close, if not actually, in the mechanical engineering field. Along the shaft and the generator we pass to the field of electrical engineering, and transmission is electrical. Taking the case of the electrified railroad, we are in electrical engineering, until we come to the wheels, then mechanical engineering, and the rails and road bed and layout of the road, civil engineering.

The whole question of engineering at the present time seems to overlap from one field into the other, and it has been suggested that we divide the engineering field into four general functional subdivisions; that we indicate by the division the type of work that an Engineer actually does.

It has been suggested that the first group should contain research and invention, including overall planning. The second division would be design and construction, the third division, operation and management, and the fourth, sales and distribution. So I want to consider our topic, this morning all the way from research on the one hand, to sales and distribution on the other.

Now, if we consider it from this

Dr. Allen R. Cullimore
President, Newark College of Engineering and noted Educator

standpoint, it is easy to see that the first two divisions, research and invention and design and construction, have characterized the work of a professional engineer almost exclusively. Most of our colleges have concerned themselves primarily, and sometimes almost exclusively, with these two fields. As time has gone on, operation and management have become more and more important, until now it would seem that a considerable proportion of the immediate problems which face engineers as a group fall into the category of certainly the third, and perhaps the fourth, division.

Problems of Distribution

When it comes to production and management, the case seems particularly clear. With the question of sales and distribution, we are looking, perhaps, a little further into the future, but I think the problems of distribution are at the bottom of many of our economic ills. There is no field—at least, in the opinion of the speaker — to which engineering analysis, methods, and point of view could be directed which would be more profitable than along the lines of the general problems involved in distribution, not only with respect to passengers and freight and with respect to air, highway, railroad transportation and pipelines, but also with respect to the organization and function of sales projects as such. In the

Address given before NSPE Thirteenth Annual Meeting, Buffalo, N. Y., December 6, 1947. Dr. Cullimore's address was delivered after Dr. Winne spoke (see page 6).

main, these matters are not being covered at the present time in many of our engineering colleges, but there has been some little sensitivity evidenced in this broader field of distribution on the part of practicing engineers.

If we look at the first two divisions, those of research and invention and design and construction, we find that they are taught in, and furnish the background of, most of our courses in engineering. It is probable that our undergraduate courses now fall pretty largely in the second field—that is, in the field of theory and design. Research, highly important, doesn't always integrate itself thoroughly with the teaching work of design and construction; and of late, as I have said, operation and management have come into the field.

If we observe from a slightly different angle, we will see that the present work of engineers — and by present I mean up until the last five or ten years — deals directly with the arrangement and functioning of inanimate things—work with inert materials. We work with things which cannot strike back, work with things where a reasonable degree of precision is obtainable and where personality elements on the part of the material are not present. But the great and present development, that of operation and management, involves the design and construction and control of groups not of inanimate things, but of human beings. It runs the whole gamut from operation of public and private utilities and general management problems to labor relations and other projects which involve the control and design of collections of human units.

"Engineers in Human Affairs"

The general importance of this human philosophy is evidenced by the fact that in its Bicentennial celebration, the Princeton College of Engineering in a three-day conference had for its theme "Engineers in Human Affairs."

The first forward and immediate step and the definite responsibility, therefore, of an engineer, is to interest himself in and attempt to solve those problems which involve human beings and to design, manage, and control groups of people—or staff, as we say—as well as to limit his work to inanimate materials. This the engineer has neglected to some extent in the past, very much to his detriment. In the main, the designer has been far away from his client. There has been little chance of a real professional relationship. Perhaps, we need a little clearer definition, or a little clearer conception, of what constitutes a professional relationship. If we think of a profession as a group of very highly trained men, and if we leave it there, a considerable number of engineers—perhaps a very great majority of engineers—would qualify as high class professional engineers. But if we take a professional man to mean one who is not only capable, but willing to serve his community in a broad way for the betterment of the community and to study and to take in community problems and financial problems, as well as strictly technical problems, the engineer has perhaps failed to qualify under the name of a professional man. The engineer has failed to integrate his work with that of the community, because his work has had nothing directly to do with relationships between human beings, but only to do with relationships between human beings and inanimate objects which he has attempted to arrange for conditions of efficiency and effectiveness.

I was thinking this morning as I came in and was talking to Dr. Steinman, we have here a good example of what I am talking about, and I am citing this not because I owe any particular debt to Dr. Steinman, but professionally we are *all* greatly in his debt. The Doctor is generally recognized as one having as full and sound a grasp of technical theory and design information in his field as anyone in this country, or in the world, but that isn't enough for Dr. Steinman. He has allied himself not only to a Society of this sort, but with great movements throughout his community, throughout the state and throughout the nation.

Valuable to NSPE

It seems to me that his example is as good as we could find and he is particularly valuable to us in this Society on account of his forward leadership. I think he probably is not only the father, but the grandfather of this particular Society and the movement for which it stands.

Now if we look at this situation with what little background material that I have tried to give, we find running through this research, invention, design, construction, operation, management, sales, and distribution, one common factor which I think is the ultimate responsibility of the engineer and the one to which, if he is to attain a real professional status, he must give considerable attention, and, that is, the general factor of profit. Things are not done, researches, inventions, and planning are not done, nor are design and construction, and nothing is operated and managed or sold and distributed, unless it can be done so at a profit. This profit, of course, is not necessarily in terms of money. It isn't in the Boy Scouts, it isn't in an organization like this, but it is in public work and community service and every project must carry itself and show some sort of general profit. It must be capable of maintaining itself, perhaps unfortunately, but usually and most generally from a financial standpoint.

Case In Point

Engineers are not sensitive enough to this point of view. For instance, the average young engineer does not realize that every engineering structure must, of necessity, and properly, be a compromise between strength on the one side, and cost on the other. I think the architect realizes this very much more than the engineer and has profited by it, for so many times at the outset the architect's work is limited by financial considerations. For instance, somebody would say, "Smith, what can you build me in the way of a residence for $100,000?" No architect would think — or perhaps it is better to say no architect, particularly in this modern day, would think—of constructing something without some regard to cost.

I remember I had a very interesting experience as a young man which brought this home to me early and which, I think serves to bring out the point. I had a very good friend in New York who ran a screw factory in Chicago, had been in the red for a great many years, and he called me one morning, knowing I was an engineer (didn't know what sort of engineer I was) and asked me if I would go to Chicago to look into the factory. I said I would.

I went to Chicago, and as I walked into the company the President of the Company said, "I assume that you are a mechanical engineer." I said, "No, I am a civil engineer." He said, "Do you know anything about the manufacture of screws?" and I said, "Unfortunately, I do not." He then asked me if I had ever been in a screw manufacturing plant, or if I had ever seen one operating, and I said that I had not. He said, "Come in and make

yourself at home and we will put all the facilities of the screw manufacturing plant at your disposal," but he telegraphed my friend in New York the purport of our conversation.

False Colors

When I got back and called up from Newark and asked to come to New York, my friend said that he didn't care to see me, that I had gone to the plant under false pretenses, that I knew nothing about the manufacture of screws, and, therefore, could give him no interesting information. He added some remarks about sailing under false colors or attempting certain things for which one was not qualified. I said to him, "I didn't know you were interested in screws primarily." He said, "What do you think I am interested in?" I said, "I thought you were interested in making money." (Laughter.) He said, "Well, of course, I am."

I told him that if he knew less about making screws and more about making money, he wouldn't have gotten into the red, in the first place.

I also told him that he knew too much about making screws, that his company was making screws which a competitor couldn't afford to make and that he was spending entirely too much money in research and development; that he had actually taken contracts for different kinds of wood screws in the last year for an automobile company and before the machines were actually in operation three of the contracts had been cancelled; that he was making 148 different kinds of screws and losing money on 120 of the lines which he manufactured, and had lost sight of everything else.

The upshot of it all was that he invited me to come to New York, and the project wound up very satisfactorily for us both, financially and otherwise.

Engineering Waits on Profit

The point is really just this: that engineering as engineering waits upon profit. Engineering jobs wait upon profit, and unless there is some considerable degree of sensitivity to profit considerations, projects employing engineers do not go on actually. In all four subdivisions of the engineering field, financial profit considerations are of the utmost importance. It is very probable that most things which call for the hiring of engineers are determined primarily on conditions of profit—perhaps on costs and on money profits, perhaps on the ability to finance the public improvement by a bond issue or otherwise. Such questions as face the policymaking Port of New York Authority rest primarily on a financial basis. One of the great —and I think the greatest—responsibilities of the engineer is to appreciate, be sensitive to, and have some considerable competency in, the matter of overall finance and financial control.

My observation has been that young engineers particularly are not, in the main, interested in service as such or in financial problems as such, because they have viewed the future profession as a thing which is a little apart from —which is a little superior to—these particular considerations. I think this arises in ignorance. A young engineer —particularly the young engineer in an educational institution—does not have brought to his attention the basic urges which characterize the development of a country such as ours. He does not see the importance of public welfare as a general proposition, and many of the boys can't see why it should do them any particular good. In other words, perhaps we might say, if we were to generalize, that the average ignorant man is intensely selfish because he does not see the oneness or the integration of all forms of activity touching his. An engineer whose activity in this day has so many contacts with his community, so many avenues of helpfulness, is in a particularly strong position when it comes to service. This should be brought to the young engineer's attention when he is in school and while he is in training, and it should be, I think, a part of our function in education to continually harp—if that is the word to use—upon the factor of service as being fundamental in professional status.

Ally with Community Projects

In addition to this, the young engineer hesitates to ally himself with community projects, in particular with politics, or anything which smacks of political consideration. This is beneath him, and he feels, perhaps, as I have heard some young men express it, that the further they are away from sordid things, such as dollars and politics, the greater will be their professional stature. The only answer to that is that if they could separate themselves so far that they could get into that rarified atmosphere of the stratosphere, they would hardly need any dollars for themselves.

(Due to space limitations, it is not possible to reproduce Dr. Cullimore's address in full in this issue. It will be concluded in the February AMERICAN ENGINEER.)

THE PRESIDENT'S CUP

Lawrie to Van Pragg

Retiring NSPE President Ritchie Lawrie, Jr. is shown presenting the President's Cup to newly elected President Alex Van Praag, Jr., as a token to be retained by incumbent NSPE chief executives. Past President Lawrie made a gift of the cup to the Society. Each outgoing President will have his name engraved on it and present it to his successor at the annual meeting, to be retained by the new President during his term of office. Also presented to Mr. Van Praag was the President's gavel which was given to the Society by the Harrisburg Chapter of the Pennsylvania Society of Professional Engineers.

Committee on Problems of Young Engineers Submits Report on Proposed Program

The Committee on Problems of Young Engineers was appointed as a result of action taken by the NSPE Board of Directors in Washington, D. C., July, 1947. It has held its first meeting and submitted the following report.

The personnel of this Committee was carefully selected by President Lawrie in accordance with the action of the Board of Directors, and the nominations were completed early in November.

The first meeting was held in New York on November 15, the members being summoned by telegraph, in order to assist the Legislative Committee and the Executive Director to prepare testimony for presentation at a hearing to be held in Washington on December 2nd on the Fair Labor Standards Act. (This hearing was postponed until January 9, 1948). The Act, which is chiefly concerned with hours and wages, does not apply to administrative and professional employees.

Administrators Definition

From its inception, the Administrator has set up a definition of professional employment which is not unsatisfactory, and substantially the same definition was followed in the Taft-Hartley Act. In its regulations, the Administrator set up a salary minimum of $200 per month below which an employee can not be considered to be in professional employment except "in the case of an employee who is the holder of a valid license or certificate permitting the practice of law or medicine or any other branches and who is actually engaged in the practice thereof." The Administrator called this hearing on December 2nd feeling that changed economic conditions call for a redetermination of this salary criterion. A petition has been filed by the United Electric Radio and Machine Workers of America to amend this proviso and require that an employee must be compensated for his services on a salary basis of not less than $500 per month in order to qualify as an executive, professional or administrative employee.

Increase in Minimum Salary

In its considerations of this proposal the Committee conferred with President Lawrie, Vice President Van Praag and John S. Kennedy, Chairman of the Employment Practices Committee, as well as the Executive Director and the Chairman of the Legislative Committee.

It was the Committe's conclusions and recommendations, in which the above named gentlemen concurred, that some increase in the minimum salary lmit is entirely reasonable and should not be opposed. Three hundred dollars a month was suggested as a fairer criterion than either the present figure of $200 or the proposed figure of $500. It was the Committee's feeling, however, that the Society's testimony should be chiefly concerned with amending the regulations to give the same recognition to registered professional engineers that is now given to registered doctors and lawyers. It was felt that there is a fundamental principle involved in this ruling and that it is a serious detriment to the recognition of the engineering profession that it is not considered on a par with medicine or law in the administration of this Act.

Professional Activities Consolidated

At this meeting in New York, Clark W. Ransom was elected Vice Chairman of the Committee and the remainder of the meeting was devoted to a general discussion of long range and immediate programs for future consideration. One important problem facing the young engineer was brought to our attention at the Annual Meeting in Atlanta in 1946 and a consideration of this problem led eventually to the appointment of this Committee. At that time, a group of engineers employed by the General Electric Company called attention to the fact that the young man who was taking his professional responsibilities seriously had to belong to a number of engineering organizations, all with annual dues and many of them with overlapping or even conflicting activities in matters of professional development and professional recognition. While the technical organizations and NSPE compete for the young engineer's limited budget for professional development, the labor unions present their case promising immediate financial returns that has had an appeal to many young men.

A nationwide poll of the American Institute of Electrical Engineers shows a definite and widespread desire for one overall society with technical divisions corresponding to the present Founder Societies but with a common "professional division," fulfilling the present aims of NSPE. It was the proposal of the General Electric engineers that professional activities of the major societies should be consolidated and that NSPE should cooperate in such a movement. Based on the study and recommendations of this Committee, the Board of Directors announced the willingness of NSPE to cooperate and discuss problems involved in such coordination with representatives of other societies. There is a great deal of activity on the part of at least one Founder Society and among groups of young men in other societies either to bring about a consolidation of existing societies or to form a new society to take over the functions of the present major organizations. Many feel that NSPE should be the nucleus of such an organization, handling professional activities, while technical matters are left to the several existing societies either in a federation or in some new all-inclusive society. There has been some disappointment among groups of young engineers that NSPE has not taken the initiative in forming such a coalition by offering some sort of affiliate membership to members of other societies, and asking the other organization to turn over to us all professional, as distinguished from technical activities. The large percentage of unregistered engineers in other societies would present a serious problem, even if we could conceive that the other societies should be receptive to such a proposal by NSPE. This matter is on the agenda for further consideration by this Committee, and it may be pointed out that many of the most difficult problems of such a consolidation will disappear when a large majority of the members of Founder Societies are also members of NSPE. We have the problem of recruiting members from the ranks of the older organizations, but it should be pointed out that a regret-

Legislative Committee's Monthly Report

Dear Fellow Member:

As the new year begins the work of the Legislative Committee falls under new direction. It is with considerable trepidation that your new Chairman assumes his responsibilities, but his concern is assuaged by the knowledge that the other members of the Committee will be available to give their advice based on sound knowledge of the problems that will face use and their experience. Your new Chairman can only promise his best efforts to continue the progress that marked the tenure of his predecessor, Mr. Ray M. Fuller.

Frederick Hill

Legislative Principles

During the final period of 1947 the Legislative Committee following extensive consultation and correspondence drafted a set of Legislative Principles. These principles were adopted by the Board of Directors of the National Society at the Buffalo Annual Meeting and will serve to guide our activities in the year to come.

The directive of the Board informs us that NSPE, being predicated upon service to Society, to State, and to the Profession, "establishes as the guiding principles of its legislative policy that it will study legislative proposals with a view to determining whether such legislation, if enacted into law, would promote the general welfare of the engineering profession, believing that legislation which would be helpful to the profession also would be in the best interests of the nation."

The Board recognized that in all legislative activity the welfare and defense of the United States must be placed above all other considerations, and to this principle your new Chairman pledges complete fealty. It was further recognized that no legislative program can be all-inclusive nor anticipate all contingencies and in this event the Committee "will be guided by considerations which will best promote the welfare of the United States and of the engineering profession."

Function of Individuals

The principles adopted by the Board provide that we regard the practice of engineering as a function of individuals and groups of individuals qualified to render such service "and we will oppose all attempts to delegate any or all of this responsibility to governmental agencies, except where it is clearly shown that such delegation is essential to the safety and welfare of the United States." Opposition is expressed to the offering by any governmental agency of engineering services, other than those specifically delegated to such agency and it is pledged that every effort shall be made to see that Registered Engineers are retained to acomplish all Federally financed engineering which is not specifically delegated to a governmental agency.

Government Employment

On the question of government employment of engineers the statement is made that "it is one of our principles that the Federal Government is entitled to, and should have the services of efficient, well qualified engineers, and we shall seek to obtain acceptance on the part of all administrative agencies of the Federal Government that engineering work performed by them shall be executed under the direction of Registered Professional Engineers."

Another basic principle adopted deals with legislation bearing on military service and the utilization of professional engineers, reading as follows:

"The utilization of engineers in the defense of our country will continue to be the concern of our Society. We will exert every effort to cooperate with the armed forces and will encourage the continued recognition by them of the vital importance of engineers, both those in private practice and employment and those serving in the armed forces, to the defense of our nation. We shall advocate the assignment and use of engineers in the armed forces on a basis compatible with their professional standing and technical ability. We shall, therefore, vigorously support all legislation to this end and oppose all legislation which will hamper the effective contribution of engineers to the national defense."

The well publicized policy of the Society on Labor Relations was reiterated as a continuing principle and will be our guide in considering any proposed changes in the Taft-Hartley Act, or other labor legislation.

A principle dealing with one aspect of the foreign problem states that legislation designed to extend engineering and technical assistance to foreign nations requiring such assistance to help them become more prosperous and peace-loving members of the community of nations should be "general in nature, advisory in scope, and should specifically bar actual designing, planning, supervision, or construction by the U. S. Government of its employees as these functions are properly within the realm of private enterprise."

Opposition was expressed to any legislation which would place the Government or any its employees in the status of technical consultants to individuals or business organizations.

Engineering Education

The Society will favor and promote the proper recognition of engineering education in the educational provisions of a Universal Military Training program, if such a program is enacted by Congress. With regard to federal promotion of basic research it was stated that there should be a prohibition against direct research or the operation of pilot plants or laboratories by the Federal Government. Any such research organization should proceed through existing research facilities and should contain an advisory non-political technical committee composed of eminent enginers, scientists, etc. it was declared.

Full support was pledged to the strengthening and implementing of engineering registration laws and specific support noted for the District of Columbia Society of Professional Engiiners in their endeavor to obtain enactment of a registration law for the District of Columbia.

Cordially yours,

Frederick W. L. Hill

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tably large number of NSPE members belong to no major technical society.

Another Major Problem

Another major problem is how NSPE can help the professional development of the great number of young engineers who are not registered.

(*Continued on page 17*)

Executive Director's Annual Report On NSPE Staff Activities

As has been the case with the entire organization of NSPE, the Washington office and staff have expanded their activities and services considerably during 1947. Again, similar to the Society itself, a considerable portion of the activities of the Washington staff have been along lines of organization and improved efficiency in order that the ground work may be adequately laid for more effective service to the Society. The report of your Executive Director is in no way a personal report. It represents combined efforts of not only the Washington staff but the many members of the Society who have contributed so loyally of their time and efforts in the administration of Society affairs. A report such as this cannot, of course, cover all of the many details in the administration of a Society of 17,000 members. Much of the Society's activities will be indicated in the reports of the various committees. This report, therefore, shall concern itself solely with the services and activities of the Washington office and such other related items as may not be covered in committee reports.

Paul H. Robbins

Legislation

The year 1947 has seen considerable activity in connection with legislation. I am sure that the members of the Board have studied with considerable interest the various information which has been distributed concerning this activity of our Society. It has been reported in detail in reports of your Chairman of the Legislative Committee, in the periodic releases of Legislative Bulletins, in the column of the Legislative Committee in the American Engineer, as well as in numerous discussions with interested groups by officers and staff of the Society. From the standpoint of the work involved for the Washington office, it may be of interest to note the following activities:

All Congressional Bills, together with hearings and debates, have been carefully scrutinized and where such legislative activity has been of interest to engineers it has been digested and reported. Where proposed legislation has been such as to directly affect the engineering profession, considerable thought has been given to appropriate means of presenting the thinking of NSPE to the legislators concerned. Where it has been deemed necessary, testimony has been prepared and given directly to the Congrssional Committee. On numerous other occasions, letters have been prepared and sent to the appropriate Congressmen outlining the views of the National Society of Professional Engineers. In order that these views may be indicative of the thinking of the membership of NSPE a number of referendums have been conducted among the legislative representatives of the various State Societies. To keep the membership informed nineteen (19) Legislative Bulletins have been prepared. These Bulletins, as you of course are all aware, are distributed to the Presidents, Secretaries and Legislative Chairmen of the Member State Societies, as well as a copy to each Chapter, for their information and discussion.

A legislative activity which entailed a considerable amount of time during the early part of the year concerned the testimony of the engineering profession in connection with the resulting Taft-Hartley law. This has been reported in detail on a number of occasions and will not be further reported at this time. In connection with this it might be pointed out that the Washington office conducted a poll of the attitude of each Chapter of the Society regarding the status of labor legislation.

Of more recent activity has been the preparation of testimony for the Administrator of the Wage and Hour Law regarding the definition of a "professional employee." A report on this preparation was presented in the December issue of the American Engineer, and will be presented by your Executive Director after careful consideration by the Legislative Committee, the Committee on Problems of the Young Engineer and the Committee on Employment Practices. Several other important activities in the legislative line have involved correspondence with each Registration Board of the country to determine recent administrative decisions or legislative action which have resulted in important interpretations regarding the registration laws of the respective States. Results of this correspondence have been summarized in one article of the American Engineer and a supplementary article has now been written and will appear in a future issue.

Much thought, a number of conferences and several draftings were involved in the preparation of a Legislative policy which was discussed at Buffalo. This policy was forwarded to the Chairman of the Legislative Committee of each State, their comments summarized, the policy redrafted after conference and discussion and the revised draft sent to State Presidents, Secretaries, Board Members and Chapters.

As might be expected, with this extensive activity in the legislative field there is considerable correspondence both from our members and other interested parties requesting information on legislation. This correspondence is answered in full and when the requested information is not available in the Washington office, necessary contacts are made to obtain authentic information for the writer.

Membership Activities

The year 1947 has been an active one indeed in the membership field. The number of members as of November 30th attests to the success of these membership activities. It is interesting to note the growth of the Society over the past two years. On November 30, 1945 NSPE had a total of 10,754 members. One year ago on November 30, 1946 this had increased to 13,928 members. With our membership today of 17,016, we show an increase of 6,362 members or a 59% increase since the same time in 1945. Additional details of membership activities will be found in the reports of the Chairmen of your Membership and Extension Committees and in our publication.

Prior to the March Board meeting the Area Chairmen of both the Extension and Membership Committees me

in Washington for an extended meeting to develop the membership program for 1947. The Washington office acted as host to this meeting which was reported in detail to the March Board meeting. The Washington office has been active in supplementing the work of these two committees. Circular letters have been addressed to all registered engineers in the following States: Arizona, Delaware, Iowa, New Hampshire, South Carolina and South Dakota. In addition to these, membership letters have been distributed through our Member State Societies and by direct mailing and otherwise. 2,000 copies of the autobiography have been distributed this year bringing the total number of this publication distributed to date to 52,000. The American Engineer has been supplied in limited quantities to several States for promotional purposes. In addition, speakers have been sent to several non-member State Societies to acquaint them with the activities and program of NSPE. Mr. Van Praag attended the Annual Meeting of the Utah Society and visited the New Mexico Society at the time of its organization. Mr. Coltharp did some excellent work in California, both in the Los Angeles and San Francisco areas. Mr. Moore made an extended automobile trip at his own expense visiting engineers of Iowa. Mr. Stanford and Mr. Emerson made several trips to South Carolina in organizing the new Society there and have also been active in contacting the professional engineers of Florida. Mr. Stolte visited the North Dakota Engineers and was instrumental in the affiliation of this group. Colonel Blew has been a tireless worker on behalf of NSPE as Chairman of the Extension Committee. In his various trips around the country he has never failed to contact his many friends and acquaintances and to discuss the values of membership in NSPE. With Colonel Blew's assumption of new duties in Washington, the extensive letter writing which he has conducted on behalf of NSPE and has been so fruitful in interesting members to join the Society fell on the shoulders of the Washington office. We feel fortunate in having been able to provide the means of continuing these important letters.

Under the able direction of Mr. Herb Moore and Mr. Clayton Miller, the Area Membership Chairmen, the State Societies in the Central and Northeastern areas were assembled in Chicago and New York respectively. It should be noted that these meetings were developed at the expense of the individuals concerned, and the contribution and value of such meetings to NSPE cannot be over-emphasized. The Society should be deeply grateful both to the Membership Chairmen because of whose initiative these meetings were possible and to the State Membership Chairmen who attended.

Publications

The Board is aware of the considerable transition through which the publication of the American Engineer is going. This transition has of necessity placed a considerable burden of activity on the Washington office. Your Executive Director remained in close contact with all the negotiations for the cancellation of the contract under which NSPE was operating during the first half of 1947. These negotiations required meetings of your Executive Director with the Publications Committee, with Legal Counsel and with the previous publisher. This required numerous trips to New York and Philadelphia. Coincident with the cancellation of the old contract there was the necessity for entering into negotiations for the continued publication of the American Engineer. As a result it was necessary to make a number of surveys regarding printing costs, advertising and other facets of the publication. Again, conferences were necessary and development of the final agreements reached. In April, as you know, the Society employed a full time Editor for the publication. The addition of this staff member was of course a necesary step in the expanded program for the American Engineer.

Plans for the publication and the arrangements under which it would be printed were dependent upon development of an adequate procedure for mailing from the Washington office. Upon study of this program, it was found advisable to combine this consideration with additional administrative considerations of the Society and these will be discussed more in detail in a later part of this report. The pamphlet on the Values of Registration was printed and distributed through our State Societies to graduating engineers.

The "Manual on Collective Bargaining" and "The Engineering Profession in Transition" publications made available to our members through our participation on the E.J.C. Committee on the Economic Status of the Engineer were also distributed. The "Canons of Ethics" prepared by ECPD and adopted by NSPE have been printed in attractive form for framing and are now available to our members. Reprints of the Autobiography and Distribution of the Legislative Bulletin have already been mentioned.

Public Relations

For some time, of course, it has been the desire both of the membership and of the Board of NSPE that attention be given to a program of public relations both for the Society and the profession. The Washington office has been very conscious of this desire and has viewed each activity of the Society with an eye toward its public relations value both for the members and for the general public. Several items of interest of a public relations nature have been referred to the Public Retions Committee and press releases have been prepared, interviews arranged, and publicity released wherever possible. Considerable work has been done in preparing publicity and securing adequate news coverage of the Annual Meeting.

It should be pointed out that NSPE is being approached more and more frequently by government agencies and other interested groups when problems affecting the profession are to be discussed. Recently we received a request from the State Department for a representative of the Society to review the International Bill of Human Rights so that the thinking of engineers could be incorporated in the discussions on this important document before the United Nations. Accordingly, President, Lawrie appointed Dr. Hale Sutherland, Retired Dean of Engineering of Lehigh University to review the proposed Bill of Human Rights, and to attend a discussion on the comments of various interested groups held in Washington early in November. Dr. Sutherland's very keen analysis of the problem and his report are on file in the Washington office for those who are interested in reviewing it.

The Washington office has been of service to a number of departments of the Government during the past year. As a few examples, we were called upon to write an article for the Treasury Department on the value of savings bonds to engineers. We were asked to review for the Labor Department a publication on women in engineering. We have been asked by both the Army and Navy to supply information to their committees correlating armed services and civilian salaries for professional employees.

(*Due to space limitations, it is not possible to publish the Executive Director's report in full in this issue. It will be continued in the February* AMERICAN ENGINEER.)

Report of NSPE's Military Affairs Committee

The work of your Committee may be grouped into three phases: First, combatting the unfavorable legislation before the first session of the 80th Congress; for the most part this was a difficult or hopeless task. Second, trying to be ready for the problems that will arise at the coming session of Congress. Third, the preparation of a long-range program to eliminate or correct those factors which have given just cause for complaint by engineers.

Medical Service Corps

The Medical Service Corps bill, discriminating against engineers in promotion and grouping them into a largely non-technical corps, passed in the last few days of the Congress, over our strongest objections. Even so, we were able to have the legislation include a Sanitary Engineering Section as a part of the overall Medical Service Corps. This was a definite improvement over the original proposal which would have made no specific provision for sanitary engineers. Representations have been continued before the Medical Department, and we have the promise of high and responsible officers of the Medical Department that a new bill will be introduced which will meet our objections. The only question remaining at issue is when this will be done. The matter of saving face is involved and will work toward delay.

The Public Health Service bill did not pass at the first session of the 80th Congress. We have gone over this bill with top officers of that service and in the bill that will be presented at the coming session of Congress, we can see no serious objections.

Army-Navy Merger

The so-called Merger bill, P.L. 253, is general in nature and its effect on engineers will depend almost entirely on the regulations that will put its provisions into effect. These are now in preparation and pending issuance information regarding their details are lacking. Neither this bill nor the Officer Personnel Act, P.L. 381, could be combatted, because of their broad nature. The latter bill contains many provisions that possibly may adversely affect engineers and the profession of military engineering.

In general, it may be said that these bills have established a new pattern in the Corps of Engineers of the Army. Officers are now commissioned in the Army, and not in specific branches. Any officer may be assigned to engineering work. Asignment to the Corps of Engineers is presumed to be based on qualifications for the work, but these are vague, and officers whose only training has been in the Army Engineer School are officers in the Corps of Engineers. In the Air Forces, engineers are groups with other ground personnel and apparently anyone may be assigned to engineering work. In some cases, former flying officers have been made post engineers. In the Navy, the civil engineering organizations continue on a high plane.

Inadequate Engineering Leadership

Among the specific problems created in the military engineering field by these laws are: The forced early retirement of most officers; except in the case of general officers, retirement will be at 50 to 55; promotion will be by selection, and there are exceedingly few places where the trained engineer will have an opportunity to distinguish himself sufficiently to reach the grade of colonel, which means he will be retired after 28 years of service or at about age 50. The greater use of non-technically trained men, since the college trained engineer is given no preference in appointment or promotion, the lack of coordination in training and equipment through the creation of at least three non-related engineering groups—Army, Navy and Air Force. Back of all of these factors, of course, is the fact that engineers are not considered professional men by the Army or the Air Force.

These defects make it highly probable that in any future emergency there will be an inadequate overall engineering leadership in the armed forces, and that engineers will be organized and utilized even less efficiently than they were in World War II. In that war, there was a definite shortage of engineers, due in part, at least, to lack of any advance planning; and we are taking no chance or risk when we assume that in another emergency, the shortage will be much more critical.

Your Committee believes (1) That qualified engineers are essential in national defense and that organization of the Armed Services should be such as to permit their utilization in proper rank and with due regard to their civilian professional skills and activities; (2) that a properly qualified and organized engineering service should be provided and maintained in the armed services during peacetime, so as to attract capable young engineers to the services, maintain the highest standards of engineering, and insure the most effective use of civilian engineering skills during emergencies; (3) that adequate overall engineering direction is needed at the highest level in the national defense establishment.

It therefore recommends:

1. That a study be made of the need for engineers by the military services, the sources of supply of engineers, and the methods for procuring engineers in time of national emergency, and assigning them to meet the needs of the armed services, government and industry. Such a study will involve an analysis of the tables of organization of the services to determine what positions require qualified engineers, thus reducing demands by the services to those actually needed for engineering work. An outline for such a study has been prepared and is attached to this report.

2. That the tables of organization of the military services be studied to determine if it would be desirable to separate the activities of present engineering groups into those requiring trained engineers and those not requiring such qualified personnel. Many of the duties of the Corps of Engineers of the Army and of the Civil Engineers Corps of the Navy could be performed by personnel with limited technical training, and these might be grouped into Pioneer and Administrative Corps', for instance, which could be subsidiaries of the larger technical corps.

3. That the United States Air Forces be contacted to determine its plans for an adequate overall engineering organization to perform such work as is carried on by the Corps of Engineers of the Army, and assistance be offered to them in establishing an adequate organization.

4. That as a further step similar assistance should be extended to other departments, arms, and services in all components of the Services which may utilize engineers.

5. That there be provided on the staff of the Secretary of National De-

The Engineer—AN INDUSTRY VIEWPOINT

(*Continued from page 8*)

for the Society adequately to represent, and be articulate upon, the engineering viewpoint in world and local affairs. And I hardly need to add that it is more and more important that this viewpoint make itself heard, because more and more of the problems are technical.

We are, by virtue of our training and position in a highly technological society, the source of much of the information — what Woodrow Wilson once called "the raw material of opinion"—upon which public decisions must be made. We are also, in many instances, the ultimate authority on its meaning. Conflicting ideas are in open, and sometimes subversive, competition for the minds of men all over the world. And our system has no inherent machinery within itself for communicating with the general public. The American economic system in contrast with most of its competitors has neither a public relations department nor a propaganda bureau. Thus, the responsibility of keeping ourselves and others around us informed, is the basis for acting responsibly on public matters.

NSPE has the opportunity to work for the improvement and uniformity in the state licensing laws governing professional engineering.

NSPE has the opportunity to work for improvement in building codes and regulations, to prevent the possibility of discrimination against new materials and methods of construction which might lower building costs without decreasing safety and quality.

NSPE has the opportunity, in this atomic age, to educate the public as to the dangers of atomic warfare, and the necessity for international control of atomic weapons.

NSPE has the opportunity to develop professional interest in young men, and to bring these young men into contact with the Society during student days and upon graduation.

Constructive Influence

NSPE has the opportunity to be a constructive influence on the standards of character, ethics and ability in the profession.

And I believe that if NSPE proves itself sufficiently adaptable and capable, it has the opportunity of becoming a society representative of the whole breadth of the engineering profession, a society which can provide for the expression and integration of opinion of the profession into a single, authoritative voice. This is a most important opportunity, a timely opportunity. To take advantage of it may require strong measures; for example, may require raising the standards for membership. Perhaps we should consider making future admission to full membership in the NSPE contingent not only on holding a Professional Engineer's license, but also require accredited membership in one of the main technical societies. I say this not as a recommendation, but simply to illustrate how open-minded and flexible I feel we must be if we are to meet this particular opportunity.

And every one of these opportunities, and the many others which each of you can voice, represents a responsibility, a real responsibility. Each of you can judge for himself whether we are meeting them.

Facts on Recognition

And now as to recognition. Sometimes I think our local units, at least, are too much concerned with recognition. Recognition cannot be appropriated, nor conferred upon one's self. Every little while I receive a letter or postcard addressed "Engineer H. A. Winne." Now I am proud that I am an engineer, but I don't want to be addressed as "Engineer Winne." It sounds stilted, and it embarrasses me. I know many other engineers who feel the same way about this practice. It seems to me we are trying to confer recognition or notice upon ourselves; perhaps we are suffering from a needless inferiority complex.

Again, recognition must be earned, earned through service if it is to have any value. This, to me, seems beyond question, and yet I feel that it is a truism which we need to emphasize again and again, particularly to our young engineers. I sometimes fear we are in danger of forgetting this. I fear too many people are accepting, consciously or unconsciously, the philosophy expressed in the writings of Karl Marx and elsewhere, "To every man according to his needs, from every man according to his abilities." From this there is easily derived the philosophy of something for nothing, or as much as you can get for as little as you have to give. Perhaps the economic theories and practices prevalent at the time Karl Marx was writing were too neglectful of man's needs, but Marx's doctrine is too neglectful of man's abilities. If the first is truly pitiful, the second is truly tragic.

Well, this has been a rather long and rambling paper, and perhaps has strayed somewhat far from the theme of this session. I have tried to look at ourselves rather frankly. I think all of us occasionally can indulge in a little searching self-analysis to advantage.

Summary

Summing up in a very few words, it seems to me that we as individual engineers, and we as the NSPE, are faced with unprecedented opportunities, and consequently, because we are fitted to utilize these opportunities, we of necessity are burdened with heavy responsibilities. If we fully meet these responsibilities, if we render the service we are capable of giving, we need not worry about recognition. It will be heaped upon us. The future truly holds out to us a tremendous challenge, and engineers are not in the habit of disregarding real challenges.

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fense an over-all Engineer-in-Chief for all of the Armed Services. His function should be to establish broad policies regarding engineering procedures, coordinate training and equipment to insure uniformity and interchangeability, and to advise regarding the utilization of national engineering resources and skills.

W. A. HARDENBERGH,
Chairman

YOUNG ENGINEERS COMMITTEE REPORT

(*Continued from page 13*)

ed. Some sort of liaison between local chapters and the private organizations of engineers in industrial plants has been proposed. The Society has already taken the initiative with respect to those engineers who have not yet qualified for registration by recommending to each of the state societies that they accept Engineers in Training as affiliates and recommending that the Committee on Constitution and By-laws study the problem of how such affiliates may be recognized by NSPE. The older, unregistered engineers in such industrial groups present a broader problem which, however, will be studied by this Committee.

The field for he activities of this Committee is very broad and the Committe would welcome reports on existing problems from local chapters and recommendations for specific investigations by this Committee.

W. F. Ryan,
Chairman

Employer Practices with Respect To Engineering Graduates

Supplemental Report[1]

.This supplemental report includes some comparative analysis of the Report of EJC Committee on the 1946 Survey of the Engineering Profession, "The Engineering Profession in Transition." The report of the preliminary survey of the Committee on Employer Practice was reported in *American Engineer*, April, 1947

THE purpose of the Engineerings Joint Council subcommittee on Survey of Employer Practice Regarding Engineering Graduates was to learn directly from a representative group of industrial employers attitudes and policies in respect to the selection, training, placement, advancement, guidance, and professional activities of engineering graduate employees.

A trial questionnaire was sent in May, 1946, to 174 employers of engineers, including small and large organizations, covering a sample of the principal industries making a practice of employing engineering graduates, most of whom have had more or less well defined courses of training and plans for advancement.

It was thought that this survey, which was a new one of its kind, would call attention to the methods of employers following the better plans for the benefit of those who either had no plan or had not perfected a plan to the best advantage of the engineering graduate and themselves, and that this objective would be a very important step in the right direction. A report[2] of this preliminary survey was published in the April, 1947, issues of the publications of the societies represented on EJC. That report included tabulated data received up to July 1, 1946, from 107 of the 174 employers.

The value of the data, as expressed by the many people who read the report, convinced the committee that it should include in a supplementary report several questionnaires received after July 1, 1946. A few additional questionnaires were submitted to a group of consulting engineers, and returns of a representative portion of that group as of May, 1946, are included in the present report.

The preliminary survey has thus been enlarged to include returns from 125 co-operators, with more than 2 million employees, among which are included a total of 38,000 engineering employees.

From these data Table 1 has been prepared. In this table individual industries are listed separately rather than by class groups, as was done in Table 1 of the preliminary report.

These industries have been arranged in order of the percentage of engineers to total employees, as shown in column 5, Table 1. Group A contains industries in which the engineers are more than 10 per cent of the total employees; Group B, between 2 and 10 per cent, group C, between 1 and 2 percent, inclusive; and group D, less than 1 per cent.

It will be noted (column 5, Table 1) that combining all of the companies reporting, the average ratio of engineering graduates to total employees is 1.9 per cent.

In order that the young engineer may see what opportunities lie ahead of him to become an executive in industry, columns 6, 7, and 8 (Table 1) have been prepared to show the number of all executives, and of engineers who are executives in the respective industries, and the percentages of all executives who are engineers, while columns 9, 10, and 11 show corresponding figures for offices in these industries. Columns 12 and 13 show the number of engineers for each engineering executive and each engineering officer, respectively, in the various industries. These two columns reveal that in companies in group D, where the number of engineers is the smallest percentage of the total employees, namely 0.5 per cent (column 5), one out of every five engineers is an executive, and one out of every 23 is an officer of a company, while in group B, where the engineers constitute 4.6 per cent of the total employees (column 5), one out of every 35 engineers is an executive, and one out of every 120 is an officer.

Another important revision of the preliminary report of this committee is shown in columns 14 to 17 (Table 1), in which estimates of the number of engineers needed up to 1950 are listed. The preliminary report showed the need over the 4-year period to be about 31 per cent of the engineer employees in 1946, while this report, covering more companies, with the results obtained by weighted averages instead of averages of percentages, shows the need of 23 per cent over the same interval, or about 6 per cent per year. This is a lower figure than one given in the Compton Committee report[3], which indicated an estimated need of 17 per cent per year. A second survey by the committee of the American Society for Engineering Education (formerly the Society for the Promotion of Engineering Education) has been made, but the data are not yet available.[4]

In view of the recent publication of

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[1] This report was prepared by the E.J.C. Subcommittee on Survey of Employer Practice Regarding Engineering Graduates, 25-33 West 39th St., New York 18, N. Y., which consists of the following: E. G. Bailey, chairman, William N. Carey (ASCE), Francis B. Foley (AIME), H. T. Woolson (ASME), R. C. Muir (AIEE), Lawrence W. Bass (AIChE), and Wm. F. Ryan (NSPE).

The survey was made by a subcommittee of the Engineers Joint Council's Committee on the Economic Status of the Engineer. The Committee is composed of representatives appointed by American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, The American Society of Mechanical Engineers, American Institute of Electrical Engineers, and the National Society of Professional Engineers.

[2] "Employer Practice Regarding Engineering Graduates, Report of Preliminary Survey," AMERICAN ENGINEER, vol. 17, no. 4, April, 1947.

[3] "The Outlook in the Demands for and Supply of Engineering Graduates," *Journal of Engineering Education*, vol. 31, No. 7, September, 1946.

[4] For an interim report of the ASEE Committee on Manpower with estimates of supply of and demand for engineering graduates see *The Journal of Engineering Education*, vol. 38, no. 2, October, 1947, pp. 110-113.—EDITOR.

the report of the E. J. C. Committee on the 1946 Survey of the Engineering Profession by Anrrew Fraser under the title, "The Engineering Profession in Transition," [5] it is interesting to compare some of the data contained in it with those which are included in the survey of this committee.

The first comparison will be found in Table 2 of this report. Here data from columns 1 and 4 of Table 1 of this report are compared with those presented in the "Distribution of Engineers Reporting Major and Minor Industry Fields," on page 87 of "The Engineering Profession in Transition." The outstanding results of this comparison are that the returns from 125 questionnaires direct from industry revealed that there were 38,000 engineers in the principal industries selected as a reasonable sample of those industries. The 1946 Survey of the Engineering Profession, in which questionnaires were sent individuals, list 28,000 engineers(see Table 2, last column, of this report) in manufacturing industries. The survey of individuals includes in addition many engineers rendering personal services and engaged in construction work wherein special training courses are not usually given. Including all engineers in all classes of employment, the individual survey covers 36,855 persons.

In this connection it is interesting to note that according to the report, "The Engineering Profession in Transition" (page 94), the number of self-classified engineers in the United States in 1946 was estimated at 317,500. The report states (page 62) that 86,900 questionnaires were sent out on Aug. 28, 1946, to members of the engineering societies comprising those co-operating as EJC and members of the National Society of Professional Engineers, duplicate names having been eliminated. Usable returns numbering 47,272 were received up to Nov. 18, 1946. The significance of these data is that the principal engineering societies have as members only 27.4 per cent of the engineers covered by the United States Census, although, presumably, a large number of the remaining 72.6 per cent should be eligible for membership.

It is evident from the foregoing comparisons of the two reports that a large number of engineers can be covered for certain purposes by surveys directed to industry. It is a question, however, whether industry can be depended upon to give the detailed information that was asked for in the

[5] For a condensed summary of this report see AMERICAN ENGINEER, vol. 17, no. 9, September, 1947. The complete report of 94 pages may be purchased through NSPE, 1359 Connecticut Ave., Washington, D. C.

TABLE 1 SUMMARY OF SIGNIFICANT DATA OF EMPLOYER PRACTICE REGARDING ENGINEERING GRADUATES
(Revised to September, 1947, data as of May, 1946.)

Group	Code	Industry	Number of co-operators	Total employment	Total employees in those companies also reporting total engineers	Total engineers	Per cent engineers from Co. (3) & (4)	Total in executive capacity-department heads to chairmen of board, engineering executives, percent engineering executives to total executives — Total	Engrs.	Per cent	Total officers, engineering officers, per cent engineering officers to total officers — Total	Engrs.	Per cent	No. of engrs. for each engrg. executive	No. of engrs. for each engrg. officer	Number of engineers, May, 1946, and estimated number needed by 1950 — 1946	1950	anticipated incr.	Per cent anticipated incr.
		Column No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
A	T	Colleges	8	4,785	1,310	585	44.6	114	67	59	70	33	47	8.6	17.7	660	840	180	27
	U	Consultants	6	2,426	2,406	880	36.7	51③	45	88	38②	29	76	19.6	30.4	780	640	—130	—17
		Totals and averages	14	7,211	3,716	1,465	39.4	165	112	68	108	62	57	13.1	23.6	1,440	1,490	50	3
B	I	Instruments	7	17,854	17,854	1,081	6.1	159	82	51	35	18	52	13.2	60.0	1,081	1,182	101	9
	F	Electrical	9	263,600	263,600	13,515	5.0	344③	111	32	136	70	51	122.0	193.0	13,440②	16,627	3,187	24
	D	Chemical	7	81,570	81,570	3,408	4.2	276①	77	28	83	23	28	44.4	148.0	3,533①	4,849	1,316	37
	A	Aircraft	7	52,500	52,500	2,049	3.9	389①	113	29	66①	16	24	18.1	128.0	3,944	4,530	586	15
	R	Utilities	10	53,878	48,628	1,857	3.8	456②	214	47	125②	57	46	8.7	32.5	1,857	2,128	271	15
	M	Petroleum	6	78,200	78,200	2,886	3.7	323②	111	34	77①	23	30	26.0	125.0	550④	750	200	36
		Totals and averages	46	547,602	542,352	24,796	4.6	1,947	708	36	522	207	40	35.0	120.0	24,405	30,066	5,661	23
C	C	Building	1	1,500	1,500	30	2.0	22	9	41	8	3	38	3.3	10.0	30	40	10	33
	J	Machinery	14	96,184	96,184	1,836	1.9	888③	393	44	152②	71	47	4.7	26.0	2,214③	2,961	747	34
	L	Paper	4	12,525	5,025	89	1.8	60②	17	28	21①	2	10	5.2	44.5	17③	20	3	18
	H	Glass	2	20,700	20,700	315	1.5	130	68	52	26	11	42	4.6	28.6	315	400	85	27
	V	Communication	1	413,000	413,000	4,700	1.1	450	135	30	175	45	26	34.8	104.0	4,700	6,000	1,300	28
	E	Coal and coke	2	6,200	6,200	62	1.0	62	25	40	25	10	40	2.5	6.2	62	105	43	70
		Totals and averages	24	550,109	542,609	7,032	1.3	1,612	647	40	407	142	35	10.9	49.5	7,338	9,526	2,188	30
D	Q	Textiles	1	1,070	1,070	10	0.9	①			4	3	75	...	3.3	10	13	3	30
	P	Soap	2	11,275	11,275	95	0.8	150	30	20	14	0	0	3.2	...	95	95	0	0
	N	Rubber	4	165,914	105,914	750	0.7	635①	80	13	53	12	23	9.4	62.0	750①	831	81	11
	B	Automotive	5	318,000	98,000	550	0.6	402①	97	24	38①	9	24	5.7	61.0	500②	660	160	32
	O	Shipbuilding	2	4,300	4,300	27	0.6	35①	6	17	7①	2	28	4.5	13.5	15①	20	5	33
	K	Metals	18	242,583	232,583	1,296	0.6	1,115③	336	30	158③	53	34	3.8	24.5	1,269④	1,420	151	12
	S	Transportation	6	394,921	394,921	1,765	0.4	2,376	362	15	415	122	29	4.9	14.5	939③	1,125	186	20
	G	Food	3	83,800	83,800	216	0.3	122①	24	20	50	1	2	9.0	216.0	216	260	44	20
		Totals and averages	41	1,221,863	931,863	4,709	0.5	4,835	935	19	739	202	27	5.0	23.3	3,794	4,424	630	17
		Grand totals and averages	125	2,326,785	2,020,540	38,002	1.9	8,559	2,402	28	1,776	613	35	15.8	62.0	36,977	45,506	8,529	23

①②③④ Indicate number of co-operators not contributing specific data.

individual questionnaires. The questoinnaire directed to industry asked for limited information that seemed to be of greatest benefit to the contributing members of industry, as well as to their employees and other engineering graduates and engineering students.

Table 3 of this report compares the average starting salaries and approximate ranges of starting salaries offered to engineering graduates by industry, as covered by the survey of this committee in May, 1946, and the survey of the American Society for Engineering Education, together with "The Engineering Profession in Transition," salaries during the first year of employment. It is noted that the first two surveys show starting salaries of $207 and $210 per month respectively, while "The Engineering Profession in Transition" (page 8, Table 1.2*a*) shows a median first year salary of $231 per month. It should be remembered that "The Engineering Profession in Transition" covers conditions as of September and October, 1946, or about five months later than the report of the committee on Employer Practice. It covers those employed under one year, which included increases over starting salary. On the other hand, it recognized that many companies reporting their starting salaries as of May, 1946, have later increased their salary scales.

On page 17 of "The Engineering Profession in Transition" salaries of those employed under one year are given for the various branches of the profession. These data are listed in Table 3 of this report without comparison, as the Employer Practice survey made no distinction with respect to the branches to which the engineers belonged.

The Employer Practice survey included some data covering the advances in payments from a small percentage of the co-operators. These are listed in Table 3, and are compared with those of "The Engineering Profession in Transition" (page 8) for experience under one year, for one year, and for two years, for all professions. This indicates a close agreement between the two surveys for experience at the end of one year and two years.

Table 4 of this report is simply a recapitulation of data in "The Engineering Profession in Transition" (page 24, Table 1.8*b*). It give the "Percentage Distribution of the Engineering Profession, by Occupational Status

TABLE 2 ENGINEERS IN INDUSTRY

(A comparison of those reported in two surveys made by Engineeers Joint Council.)

	Employer Practice Regarding Engineering Graduates, sample survey, May, 1946 — No. of companies co-operating	Number of engineers	"The Engineering Profession in Transition," Aug.-Nov. 1946, p. 87, No. of engineers
Education, colleges	8	585	1,793
Consultants, independent	6	880	954 (1)
Consultants, employees private firms	..	.....	1,579 (2)
Instruments	7	1,081	.... (2)
Other manufacturing industries	..	.....	1,041
Electrrical equipment, mfrs.	9	13,515	3,471
Chemical, soap, etc.	9	13,515	3,471
Aircraft	7	2,049	1,125
Utilities, electrical and gas	10	1,857	3,527
Petroleum	6	2,886	1,230
Building products, cement, stone, glass	3	345	242
Machinery	14	1,836	1,820
Paper	4	89	248
Communications, telephone,			
Coal and coke	2	62	386
telegraph, radio	1	4,700	1,554
Other mining	..	.....	1,867
Textiles	1	10	140
Rubber	4	750	351
Automotive	5	550	289
Shipbuilding	2	27	....
Other transportation and equipment	..	.....	602
Metals, iron and steel and nonferrous	18	1,296	2,334
Transportation, Railroads	6	1,765	510
Food	3	216	388
Sub-Total	125	38,002	27,859
Agriculture, forestry, and lumber	..	.....	188
Printing and publishing	..	.....	69
Construction, bridges, buildings, highways,sewerage, waterwks, etc.	..	.....	6,807
Water and sanitary services	..	.....	612
Personal services, refrigerating, ventilating, insurance, wholesale and retail trade, legal and others not specified	..	.....	3,853
	125	38,002	39,288
Deduct for duplication of Consultants (1)	..	.....	2,533
Net Total	125	38,002	36,855

(1) Page 88.

(2) Not specifically listed, hence included in other manufacturers not specified.

TABLE 3 ENGINEERS IN INDUSTRY

(A comparison of initial and early salaries as reported in three surveys made in 1946.)

	Ranges of starting salaries, $per mo.	Average starting salary, $per mo.
EJC Committee for Survey of Employer Practive Regarding Engineering Graduates as of May, 1946, largely bachelors	150-250	207
American Society for Engineering Education, "Compton Committee," May 1946, bachelors only	125-320	210

EJC Committee on the 1946 Survey of the Engineering Profession (Sept.-Oct., 1946)

	Lower 10%	*Upper* 10%	Median
"The Engineering Profession in Transition," under one year's employment (not starting salaries), p. 8, Table 1.2*a*	181	298	231
Engineers by professions, under one year, including all degrees (p. 17)	(1)	(1)	
Chemical	(200)	(340)	256
Civil	192	311	243
Electrical	(170)	(400)	237
Mechanical industrial	178	286	225
Mining-Metallurgical	(150)	(320)	236
Other	(150)	(320)	224

Approximate increases in pay from Employer Practice reported by employers, May, 1946 (mostly bachelors)		"Engineering Profession in Transition," p. 8, Table 1.2*a*	
Start	$207	At end 18 mo.	257
At end 6 mo.	224	At end 24 mo.	267
At end of 12 mo.	237	Under 1 yr.	$231
		Experience, 1 yr.	232
		Experience, 2 yr.	262

(1) Items in parentheses are near extremes from pp. 76, 77, and 78 and not lower and upper 10 per cent.

TABLE 4 DISTRIBUTION OF THE ENGINEERING PROFESSION BY OCCUPATIONAL STATUS AND GENERAL FIELD OF EMPLOYMENT, 1946, FROM EJC SURVEY, "THE ENGINEERING PROFESSION IN TRANSITION," P. 24, PER CENT

Occupational status	Total	Chemical	Civil	Electrical	Mechanical, Industrial	Mining, metallurgical
Teaching, college, university, and other	4.7	5.1	4.5	4.3	4.9	4.4
Consulting, independent	3.7	1.9	6.9	1.4	2.8	5.3
Consulting, private employee	4.3	2.7	3.9	5.6	4.7	4.5
Total Consulting	8.0	4.6	10.8	7.0	7.5	9.8
Administration, management, non-tech	3.7	1.3	2.4	1.9	2.3	4.0
Administration, management, technical	31.3	32.2	31.5	28.3	30.6	40.2
Construction, supervision	4.8	0.7	13.3	3.6	1.9	0.7
Personnel, labor problems	0.2	0.2	...	0.1	0.2	0.1
Total Administration and Management	40.0	34.4	47.2	33.9	35.0	45.0
Design	15.4	10.7	20.1	18.0	18.7	0.3
Development	7.0	17.0	2.5	9.3	7.8	4.6
Analysis and testing	2.2	0.9	1.2	3.0	3.2	2.5
Drafting	1.1	0.2	2.0	0.8	1.7	0.1
Patents	0.3	0.4	...	0.3	0.3	0.6
Research, basic	0.6	0.7	0.5	0.4	0.7	1.4
Research, applied	6.0	13.8	2.2	4.9	5.4	14.6
Total Design, research, and development	32.6	43.7	28.5	36.7	37.8	24.1
Estimating	1.1	0.3	2.0	1.1	0.8	0.5
Inspection	0.9	0.2	1.2	1.0	0.8	0.9
Installation	0.6	0.1	0.2	1.4	0.7	...
Maintenance	2.0	0.5	2.0	2.8	2.5	0.2
Operation	2.5	3.1	0.9	3.5	1.9	6.0
Production	2.2	5.2	0.2	0.9	2.6	5.3
Safety engineering	0.3	0.1	0.2	0.2	0.2	0.6
Total manufacturing and production	9.6	9.5	6.7	10.9	9.5	13.5
Sales	4.4	2.3	1.5	6.5	4.8	2.4
Editing and writing	0.7	0.4	0.8	0.7	0.5	0.8
Total Sales, etc.	5.1	2.7	2.3	7.2	5.3	3.2
Total, per cent	100.0	100.0	100.0	100.0	100.0	100.0
Total engineers reported above	36,546[a]	3624	8601	9239	8708	2780
Number reporting as student, unemployed, retired, or other occupations not specified (not included in percentage and total)	1,089	48	266	217	196	75

[a] Includes 2429 other engineers, and 1362 non-engineering, omitted from column analysis.

and General Field of Employment, in 1946," or by professional groups, as recognized in the Founder Societies.

The occupational-status listings of the report have been regrouped to cover six main headings:

1 Teaching
2 Consulting
3 Administration and management
4 Design, research and development
5 Manufacturing and production
6 Sales, etc.

These listings covered on the average 97.7 per cent of all the occupational listings. The 2.3 per cent not covered includes engineers reported as students, unemployed, retired, or in other occupations not specified.

It is interesting to note that the administration and management occupational status covers 40 per cent of those reporting, and in different professional groups varies from 33.9 per cent in electrical to 47.2 per cent in civil engineering. Next in importance is design, research and development, which averages 32.6 per cent, and varies from 24.1 per cent in mining to 43.7 per cent in chemical engineering. Then comes manufacturing and production, with 9.6 per cent average, and varying from 6.7 per cent in civil to 13.5 per cent in mining engineering. Consulting, both independent and private employees, averages 8 per cent, and varies from 4.6 per cent in chemical to 10.8 per cent in civil engineering. Teaching averages 4.7 per cent, and runs uniformly in all branches of the profession, varying only from 4.3 to 5.1 per cent. Sales, averaging 5.1 per cent, varies from 2.3 per cent in civil to 7.2 per cent in electrical engineering.

It seems to this committee that this information constitutes a most valuable portion in the report of the 1946 Survey of the Engineering Profession. It should be of great interest to educational institutions as well as to management, as it indicates where engineering graduates are now being employed.

NOTE: The foregoing report was received by the Engineers Joint Council at a meeting held on November 17 and the committee was discharged. Appointment of another committee to continue studies at this field was authorized and is in process of organization.—EDITOR.

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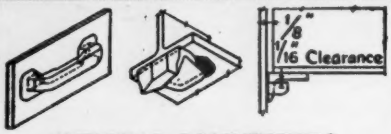

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NSPE's Marshall Plan Resolution

The importance of professional engineering services to the success of the Marshall Plan was recognized by the Board of Directors of the National Society of Professional Engineers at its recent meeting held in Buffalo in conjunction with the Thirteenth annual meeting of NSPE.

While the action of the Board neither favored nor opposed relief and rehabilitation legislation for distressed European countries, it did recognize the planned Congressional consideration of legislation to deal with such problems and go on record as favoring professional engineering personnel as part of any organization to administer such laws.

Marshall Plan Resolution

The resolution, as passed by the Board of Directors reads as follows:

Whereas the United States Congress will consider proposals for the relief and rehabilitation of European countries which are suffering from hunger and economic disorder as the aftermath of World War II; and

Whereas relief and rehabilitation legislation will be ineffective unless it is designed to restore such countries to a self-sufficient and stable economic position; and

Whereas such a self-sufficient and stable economic position cannot be established without the rebuilding and construction of many plants and facilities; and

Whereas adequate planning, rebuilding and construction work can only be done properly under the supervision of a professional engineer or engineers;

Therefore, be it resolved that the National Society of Professional Engineers shall petition Congress to provide that professional engineers be placed on any boards (or other agencies) designated to administer such relief and rehabilitation legislation as may be enacted.

Road Line Markings

The Board of Directors also went on record as favoring a uniform system of road line marking throughout the United States. This resolution was presented to NSPE by the New Jersey Society of Professional Engineers and was unanimously adopted with an amendment requiring that NSPE take the matter up with the Public Roads Administration and the Conference of State Highway Officials. As adopted, the resolution reads as follows:

Whereas our highway systems are being taxed with increasing motor vehicle traffic and every reasonable effort should be exercised to maintain safe travel on our highways; and

Whereas investigation indicates that a system of line markings on highways will serve to guide vehicular traffic at hazardous turns and changes in elevations, especially on two and three lane roads; and

Whereas such a system of markings properly and intelligently applied will win the cooperation of drivers of the States and tend to prevent irresponsible cutting out of prescribed lanes;

Therefore it be resolved that the New Jersey Society of Professional Engineers respectfully request the National Society of Professional Engineers to endorse the adoption of uniform standards of line markings throughout the various States of the United States and that appropriate representations in connection with this policy be made to the Public Roads Administration and the Conference of State Highway Officials.

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National and State Society News

NEWS FROM THE WASHINGTON OFFICE

CONNECTICUT

The Connecticut Society of Professional Engineers is in the process of revising its chapter organizations to make them conform to the population distribution of the state.

The State Society has been instrumental in forming a new Hartford County Chapter and is now working on Fairfield County and New Haven County Chapters. These new groups will replace smaller and more numerous units which, until recently, have been a part of the state organization.

It is felt by the state organization that the new Chapters will be more vigorous and self supporting than the former groups. The reorganization has required a revision of the State Society's Constitution and By-Laws.

MASSACHUSETTS

The Metropolitan (Boston) Chapter of the Massachusetts Society of Professional Engineers held a meeting December 2, at which planning developments in Boston were discussed by Thomas E. McCormick, executive director of the Boston City Planning Board and a member of the Metropolitan Chapter.

MINNESOTA

The 15 member societies of the Minnesota Federation of Engineering Societies will stage their twenty-sixth annual Engineering Convention and third annual Engineering Exposition Feb. 11 to 14 in St. Paul, Minn.

Luncheons, business sessions, symposiums, technical discussions, dinners and talks by state and national figures have been booked for the convention in Hotel Lowry, while exhibitors already are preparing hundreds of the latest properly engineered products and devices for exhibition in the Municipal Auditorium.

NEW YORK

The New York State Society has been actively attempting to curb misuse of the term "engineer" throughout the state. This campaign is meeting with some success.

The November issue of PE NEWS, which is published monthly by the State organization, reports:

"Since the last issue of PE NEWS the system of handling complaints against the use of the terms "engineer" or "engineering" by individuals and concerns has resulted in discontinuance of the practice in a number of instances. One company discontinued the use of the term "heating engineer"; two companies will change the names of their concerns; a radio sales and service store has discontinued advertising "Electronic Engineer" and an "automotive engineer" has become a "motor specialist." One Engineering Company proved in fact to be the enterprise of a licensed professional engineer. All that was required was that he sign identify himself upon letterheads and other literature — which was immediately done. Two other companies were investigated and proved to be engaged in legal activity under interstate commerce provisions of the education law.

"Still pending are replies from a

Dayton Conference on Fire Prevention

L. to R. Robert Allen, President, Dayton Society; Ray R. Gill, Ohio State Fire Marshall; and R. G. Kurfiss, Chief Inspector, Dayton Fire Department.

Coming Events To Remember

State Meetings

January 9 and 10, Pennsylvania Society annual meeting, Brunswick Hotel, Lancaster.

January 15 and 16, Texas Society annual meeting, Plaza Hotel, San Antonio.

January 16 and 17, Oklahoma Society annual meeting, Mayo Hotel, Tulsa.

January 2 and 24, Wisconsin Society annual meeting, Pfister Hotel, Milwaukee.

January 29, 30 and 31, Illinois Society annual meeting, Joliet.

February 11 and 12, Minnesota Association annual meeting, Lowry Hotel, St. Paul.

March 18, 19, and 20, Ohio Society annual meeting, Netherland Plaza Hotel, Cincinnati.

April 9 and 10, New Jersey Society annual convention, Essex House, Newark.

insulation engineer and a demolition engineer." Also under investigation is the case of an employee of a licensed professional engineer who is alleged to have represented himself as a "consulting engineer" and to have accepted a personal fee in payment of engineering work done by him."

* * *

The Autumn meeting of the Board of Directors and the Membership meeting of the NYSSPE, held at Utica on October 24 and 25, proved to be one of the most interesting of recent years and introduced several subjects of lively discussion.

Perhaps the most outstanding event of the meeting was the presentation of a public relations program by Harold Funk, chairman of the NYSSPE Public Relations Committee. The plan, as presented, is linked up with all activities of the Society and will require much detailed preparation before being implemented at Chapter level. To outline the program necessitated deliverance of a prepared talk accompanied by various charts and graphs produced by Mr. Funk. Presentation of the subject in this matter occupied approximately one hour during which the audience was held in rapt attention. At the conclusion of the presentation it was voted to accept the plan in principle and Mr. Funk has now undertaken the task of adapting it to practical and scheduled use.

The subject of possible constitutional revision to permit acceptance of classes of membership other than those qualified by Professional Engineers Licenses, invoked heated discussion. It was explained that many questions involved therein should be answered by the Special Committee to study the so-called Ransom Report which is now functioning under the chairmanship of Charles W. Burke. Dr. Arthur Sheridan also touched upon the subject in a prepared talk which he originally had been asked to give at the luncheon meeting. At his request, time was instead allotted during sessions of the meeting, so that he might speak more plainly in constructive criticism of some aspects of Society affairs. At the conclusion of his remarks it was voted that Dr. Sheridan's talk be reproduced and distributed to the chapters.

In addition to the lively interest developed in meeting topics, the delegates and members attending were most favorably impressed by the excellence of arrangements for the meeting which had been made by the host chapter—The Oneida-Mohawk Chapter. Before the meeting adjourned a rising vote of thanks was extended to the Chapter and it was voted that President Larkin address a letter of appreciation for the personal efforts of Chapter President Stephen Zingerline and of Carl Zampohn, chairman of the committee on arrangements.

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On November 10, 1947, the Dayton Society of Professional Engineres, in cooperation with the Engineers Club of Dayton, sponsored a meeting on the engineering aspects of fire prevention to which various city officials, representatives from industry, the Chamber of Commerce, and Business were invited to discuss this problem.

Mr. Ray Gill, Ohio State Fire Marshall gave the principal speech and Mr. R. G. Kurfiss, Chief Inspector of the Dayton Fire Department, gave an illustrated talk on the problems of fire prevention (See photograph, page 24).

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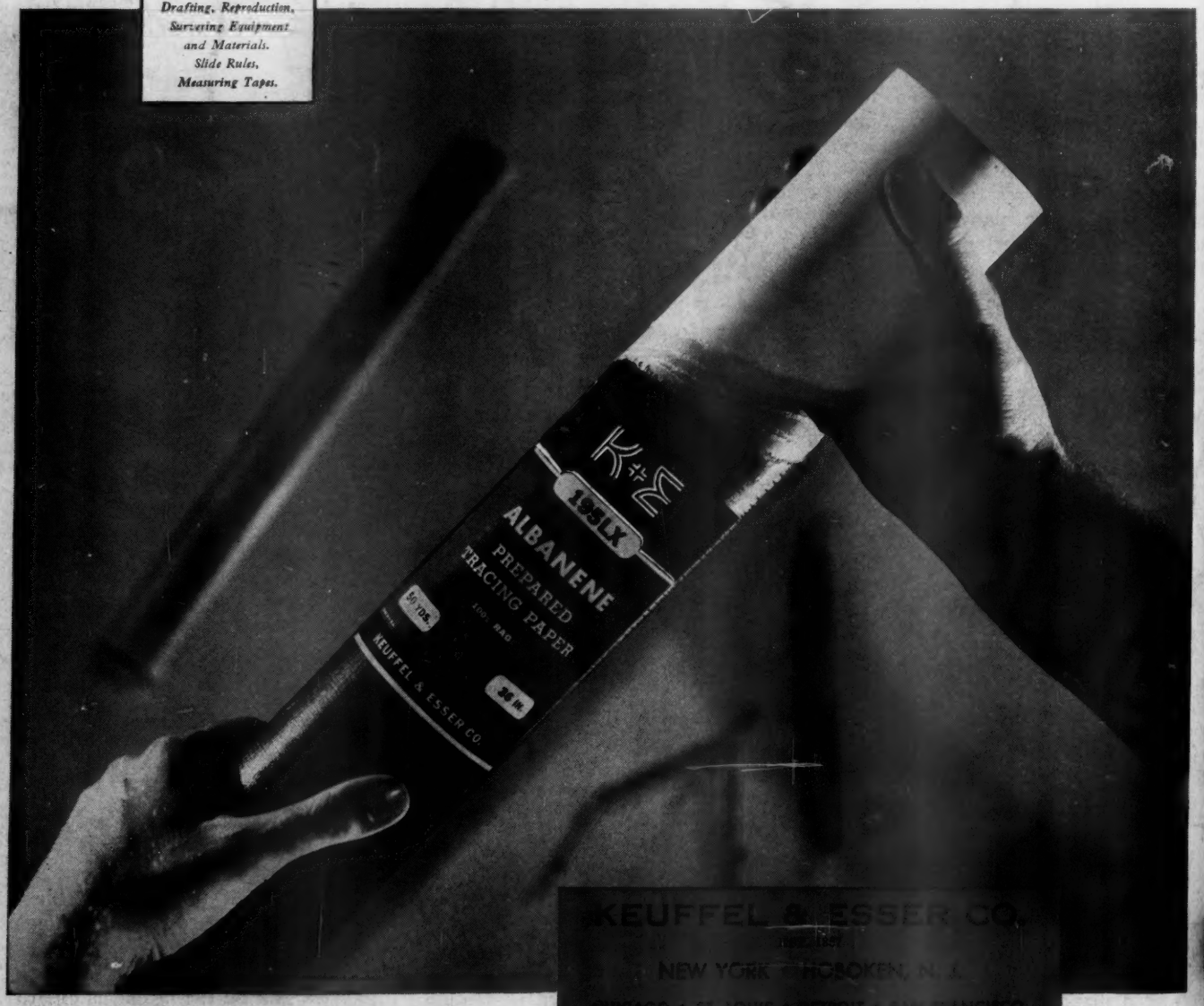
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